GAS JOURNAL, AUGUST 23, 1939

VOL. 227 91st YEAR No. 3979

Editorial Notes

Fuel Economy in Gas-Works

READERS will have been interested in the provocative Paper by Mr. L. M. Wilson on "Fuel Economy in Gas-Works," recently published in the "JOURNAL." The Author expressed several very definite views on a subject which is, of course, of very great importance to every gas undertaking, but which is not, we suggest, nearly so easy of solution as Mr. Wilson would have us believe. In approaching the problem many factors have to be considered and the ultimate criterion of any particular system of heating a carbonizing unit and recovering what would otherwise be waste heat must be one of cost. For many years much careful and serious thought has been given to this question of fuel economy in gas-works, and in view of this we think that the Author's dogmatism is out of place. For example, in advocating the regenerator setting and condemning the use of recuperators, Mr. Wilson stated: "One of the reasons why recuperators die so hard is that in these scientific days people are disinclined to accept the bare fact that the fuel consumptions differ, but must know why. This attitude is right, but it does not justify the mind that denies the existence of the obvious until it can be explained, nor does it make any more welcome those research workers who lack the moral courage to admit that they do not know but must proceed to prove that they do not by displaying their dismal ignorance of the natural laws." Who are these offenders? We have discussed the subject of fuel economy in gas-works with several research workers in the Gas Industry, and we have certainly not discovered the attitude of which Mr. Wilson complained.

What the Author would like to see is the outside producer and the regenerator in place of the inbuilt producer and the recuperator. Firing a setting with cold, clean producer gas has obvious appeal. It facilitates control, prolongs the life of the setting, and, of course, the external producer can utilize cheap fuel-breeze. On the other hand, of recent years the burning of breeze in inbuilt producers has been proved a technical success. It has been shown that up to 45% of the producer fuel can be below ⅝ in. Such a practice means increased grate area, increased steam consumption per pound of fuel gasified, and increased labour cost. Taking all the factors into consideration it might on analysis be found that in certain circumstances the added costs of gasifying breeze were as great as if larger coke was used in the producer and the breeze utilized for steam raising in breeze burning boilers.

Moreover, Mr. Wilson, in comparing the regenerator with the recuperator, failed to point to the essential difference in heat exchange possibilities when using hot producer gas and preheating the secondary air only by the waste gases in a recuperator and when using a regenerator and preheating not only the secondary air but also the cold producer gas by the heat in the waste gases. The amount of heat which can be taken from the waste gases must obviously be greater with the latter system. But this is not a true comparison between the thermal transfer efficiency of a recuperator and a regenerator. Their operating conditions are dissimilar.

There is another point we would mention. We have seen some surprisingly low figures for fuel used for heating settings of retorts and ovens, but have regarded them with an element of caution. If, for example, the pull on the retort or oven is such that it results in the infiltration of air to the charge being carbonized, this air will burn and provide a measure of heat for carbonization. Its influence will be reflected in the lower fuel consumption figure found, but this lower figure will not mean that the plant is being operated at greater efficiency. Then, in regard to continuous vertical retorts, there is a disadvantage in using secondary air to cool waste gas in that no cooling medium, other than steam, remains for cooling the coke. Because coke leaves the discharge box of a continuous vertical retort at, say, 200° to 300° C. it does not follow that the sensible heat has been utilized. Actually, in many cases, the coke leaves the retort and drops into the box at a temperature of about 700° C., and the difference between the two figures represents heat lost by radiation. We think that many workmen employed in operating continuous verticals would agree with us. As we have tried to indicate, the problem of fuel economy in gas-works is not one on which it is easy or wise to dogmatize.

Gas for Power

WE think the Industry is paying insufficient attention to the gas engine as an industrial gas load builder. The possibilities are there, and development of the gas engine load is worthy

of concentrated effort, particularly in view of the recent strides which have been made in the design of new types of engine. Reference to these notable advances was made in the "JOURNAL" for July 5 last, and they cover both stationary and mobile units. A high-compression engine has been evolved which is identical in operation except for a new type of carburetter, with the ordinary stationary Diesel engine, and Diesel engines of any make can be quickly converted at small cost, and without loss of efficiency, to the gas-driven principle. At present this engine uses from 5% to 10% of the total fuel requirements in the form of diesel oil for ignition, but it is anticipated that working on 100% gas will be possible before long. A thermal efficiency of 40% compared with 26% previously with gas has been achieved, which puts a new complexion on the question of running costs. The ancillary advantages of using gas, such as elimination of fuel storage and lower maintenance costs, are to be taken into account, and the importance, from the national standpoint, of employing a home-produced fuel in place of imported oil needs no stressing.

The American Gas Industry is awakening to the potentialities of the gas engine load, as the latest report of the Gas Engine Power Committee of the American Gas Association shows. For example, it is reported that in Southern California alone there is used between 400,000 and 500,000 horsepower from internal combustion engines operating on gas fuel, and of this amount about 100,000 h.p. is employed in industrial power applications such as operating machinery, refrigeration, electricity generation, water pumping, and air conditioning. And while, as was to be expected, the major portion of the load was gained by natural gas, the manufactured gas undertakings are developing the business also and adjusting their rates to bring gas within the competitive field.

That diesel engines are readily convertible to gas is obviously a matter of great importance to the Gas Industry. These units represent a good load building proposition not only where the rates for gas throughout the year are competitive with oil, but where low gas prices can be made available for part of the year, during the off-peak season, and gas can be used for such periods and oil on peak load. In America, applications of gas engine power include installations where four cylinders of an eight cylinder engine are fed with gas and the other four arranged for compressing air; where the exhaust gases are purified and used as inert gas for maintaining neutral atmospheres in heat treating furnaces or over varnish pots; and where the excess mechanical power generating capacity of engines at low loads is utilized in the generation and storage of both electrical and heat energy.

We feel that more interest should be taken in the utilization of the waste heat from gas engines, for it is practicable to recover a very large proportion of this heat. The heat could be used for heating water for use in circulating systems or as boiler feed water. The economy of using the waste heat in exhaust gases and engine jacket water for heating buildings and factories has been demonstrated both in America and also in this country. Given attractive tariffs for gas the Industry has to-day a most convincing case to put forward, and time should not be lost in bringing keen sales methods to bear on the development of what could without much difficulty become a substantial industrial load for gas. And towards this end the Gas Industry would be well advised to work in closer co-operation with the engine manufacturers, who, in making the new types available, have brought to bear on their work the results of researches which have been conducted for several years. Approached in the right way, the power load presents a fine opportunity for gas to make up lost ground.

Nor must sight be lost of developments which are taking place in the combustion gas turbine—a machine which has received an enormous amount of attention from inventors. The efficiency attainable under present conditions is in the neighbourhood of 18%, which, of course, compares unfavourably with the other prime movers we have been considering. However, this could be increased by 28% if the gas inlet temperature could be raised from 1,000° to 1,300° F. In a recent Paper to the Institution of Mechanical Engineers Dr. Adolf Meyer expressed the view that it would be possible in the near future to raise the temperature to 1,200° F. The combustion turbine cannot yet compete with the modern steam plant for base-load purposes. On the other hand it has special advantages. It is of simple design, comparatively cheap, light, requires little space, and is not dependent on any water supply. It seems to offer interesting possibilities as a stand-by and peak load unit.

Rating

IT has frequently been stressed in the "JOURNAL" that while national expenditure is of necessity at a level before unknown in times of peace, the activities of rating authorities should be curbed. There is no doubt that the extension of the present quinquennial period from 1939 to 1941 took many rating authorities unawares; they had in many cases already entered into agreements with professional firms of rating surveyors to carry out the revaluations for the new Valuation Lists which should have become operative in 1939.

As might, perhaps, be expected, rating authorities have been urged to have a revaluation this year, and then to have another in 1941. Such advice appears to us to be wholly inconsistent with the principle of the Rating and Valuation Act, 1925, the object of which was to avoid constant revaluations by the establishment of the "quinquennial period." As the Central Valuation Committee have pointed out, the valuation ascertained at the beginning of this period should be maintained, in normal circumstances, for the duration of that period.

In the happier day of 1925 when the Rating and Valuation Act was passed, it was desired to spare the ratepayer the cost and labour of too frequent revaluations. At the present time, when undertakers are employed in making the various reports required by the Civil Defence Act, and in carrying out the work specified in these reports, the attempts to obtain rating revaluations would appear to be contrary to the national interest. There are, of course, cases which obviously demand a revaluation, and no one would wish to deny the right either of the rating authority or of the gas undertaking at any time to make a proposal for revaluation where circumstances have so materially and substantially changed as to make the last valuation incorrect and unfair.

There is, however, quite another type of case in which there exists no obvious reason for re-assessment; here, too often, the rating authority says, in effect, "let us use our statutory power to obtain information from the gas undertaking and see whether from that information we can manufacture a case for an increase." As often as not the information which it is sought to obtain relates only to a small portion of the gas undertaker's area, and no regard whatever is paid to the position of the undertaking as a whole. In the present unsatisfactory state of the Law, many undertakings may find it difficult to resist a re-assessment at the present time, but if this is the case, certainly no additional revaluation should be carried out in 1941. Rating authorities could not, surely, be so unreasonable as to refuse to give an assurance that where a revaluation takes place during the present year, that valuation will be accepted for the third Valuation List.

The Report of the Departmental Committee on Rates will, it is understood, shortly be issued. This report will not deal with the assessment of public utility hereditaments. It is, however, much to be hoped that the Government will be willing to pay some attention to these bodies, which are among the largest ratepayers in the country. A promise to that effect was given by our present Prime Minister in 1924 when he was Minister of Health. The rectification of the position would require only a few amendments of the present Act, and if some measure of agreement could be obtained legislation would not to any extent encroach upon Parliamentary time.

The Alkali Inspectors' Report

THE production of concentrated ammoniacal liquor continues to rise, as was to be expected in view of the tendency to centralize production of sulphate. Reference to this is made in the Report for 1938 of the Chief Alkali Inspectors, an extract from which appears on a later page. Centralization, the elimination of small and uneconomic plants, has made it possible for the majority of manufacturers to operate at a modest profit—but only after the most careful technical control of plant and a very keen eye indeed on working costs. There is no doubt that concentration of liquor assists the small gas-works in the problem of overcoming the economic difficulty of by-product ammonia recovery, and in this regard we would call attention to the advantage of embodying a decarbonator in the plant. It enables the production of a more concentrated liquor by removing the trouble of crystallization in the condensers, in the storage tank, and in the tank wagons used for transport. The total production of ammonia products by gas-works remains practically the same as in the previous year, and the same applies to the quantity of tar distilled.

As in previous reports, considerable space is devoted to industrial smoke, particularly to the escape of "green" gas from coke ovens. Mr. Damon, the Chief Inspector for England and Wales, reports "some improvement" at most of the newer coking plants. This can be attributed to better maintenance and management of the ovens, together with lower rates of working. Mr. Damon suggests that much benefit would result from some method, mechanical or otherwise, whereby oven door cleaning could be properly and more speedily carried out. While expressing regret that none of the newer batteries has been provided with duplicate gas collecting mains—which would overcome the escape of green gas—he records the success of the scheme previously advocated whereby a spare port of an oven about to be charged is temporarily connected by a cast iron bend to the adjacent oven. Smoke and grit emissions from gas-works have been the subject of several complaints, most of which, states Mr. Damon, "have been amply justified." In regard to grit, which arises chiefly from the operation of water gas plant, it is not a difficult or expensive matter to install efficient arrestors. The recommendation is made in the report that where screening of dry coke is practised the rotary screens should be enclosed in housing, and, if necessary, draughted to a grit arrestor.

Reference is also made to the work of the Regional Committees on Smoke Abatement and the efforts of the Manchester Committee to promote a Joint Statutory Board. This project is supported by a number of neighbouring authorities, a combination of which would provide a substantial and continuous area, but there are other authorities which object to sharing control and regard the cost as too high. It is estimated that the expenses of the Board would be met by one-ninth of a penny rate—a sum which ought not to be considered excessive in view of the advantages to be gained. Reference is made, too, to the setting up of the Greater London Advisory Council for Smoke Abatement and the Council to cover Bristol and District. It is to be hoped that the setting-up of these two Councils will provide encouragement to other industrial districts to follow their example. A representative body with unified policy and collective knowledge should have a useful sphere of action in the matter of smoke abatement, and its constitution should ensure that the proposals it puts forward are practicable. The Alkali Report naturally deals only with industrial smoke. It is the domestic fire burning raw coal which is the chief offender in polluting the atmosphere. In London the proportion of domestic smoke to industrial smoke is of the order of 2.15 to 1. The cost of smoke is enormous. We look to the day when premises producing no smoke—both industrial and domestic—will have a lower rate assessment than those which are smoke producing.

Course for Teachers of Gas Fitting

ON a later page we refer to the course for teachers of Gas Fitting organized by the Board of Education. The third of its kind, it was this year held at Nottingham from July 3 to 8. In every way it was successful, and the Industry owes its thanks to Nottingham University and the Gas Department for their help and hospitality. These courses, the aim of which is to improve teaching technique, are undoubtedly beneficial. They act as a source of inspiration to the teachers; and during the courses there is ample opportunity for informal discussions on the practice of gas fitting, the methods of different areas being compared and criticized. The importance of well trained fitters cannot be over-emphasized, and by releasing the members of their staffs to attend these courses undertakings are acting in the best interests of themselves and of the Industry as a whole.

Personal

In consequence of ill health, Mr. J. B. Hansford, Director, Engineer, and Manager of the Bedford District Gas Company, will retire at the end of September. He has been associated with the Company for many years, having been appointed Engineer and Manager twenty years ago.

Forthcoming Engagements

Aug.

30.—**I.G.E.**—Sub-Committee on Combustion Characteristics of Town Gas, 2.45 p.m.

There will be no meeting of the Central Executive Board of the National Gas Council or the Central Committee of the Federation of Gas Employers during August.

Sept.

6.—**L.C.C.A.**—Advertising Sub-Committee, 2.45 p.m.

7.—**North British Association.**—Annual General Meeting, United College Hall, the University, St. Andrews.

8.—**L.C.C.A.**—Coke Distributors' Branch Central Committee, 2.30 p.m.

11.—**I.G.E.**—Research Executive Committee, 2.30 p.m.

12.—**I.G.E.**—Finance Committee, 10 a.m.; Membership Committee, 11 a.m.; Council, Gas Research Board, 11.15 a.m.

13.—**I.G.E.**—Pipes Committee, 2.30 p.m.

18.—**L.C.C.A.**—Finance Committee, 10.45 a.m.; Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.

19.—**I.G.E.**—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.; Gas-Works Safety Rules Committee, 2.30 p.m.

19.—**L.C.C.A.**—Technical Committee, 2.30 p.m.

21.—**S.B.G.I.**—Council Meeting, 11.15 a.m.

21.—**I.G.E.**—Refractory Materials Joint Committee, 2.30 p.m. (at Stoke-on-Trent).

21.—**Wales and Mon. Association.**—General Meeting at Porthcawl.

22.—**North of England Association.**—Autumn Meeting at Malton.

26.—**B.C.G.A.**—District Conference at Stroud.

29.—**I.G.E.**—Liquor Effluents and Ammonia Committee, 11.30 a.m.; Joint Research Committee, 2.30 p.m.

Oct.

3.—**I.G.E.**—Research Executive Committee, 2.30 p.m.

5.—**B.C.G.A.**—South Wales District Conference at Neath.

6.—**I.G.E.**—Joint Committee on Complete Gasification under Pressure, 14, Old Queen Street, S.W. 1, 3 p.m.

9.—**I.G.E.**—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.

10.—**I.G.E.**—Council, 10 a.m.

11.—**I.G.E.**—Board of Examiners, 2.30 p.m.

17.—**I.G.E.**—Gas Education Executive Committee, 2.30 p.m.

17.—**B.C.G.A.**—Northern District Conference at West Hartlepool.

25.—**B.C.G.A.**—South-Western District Conference at Taunton.

30.—**L.C.C.A.**—Annual General Meeting, May Fair Hotel, W.

News of the Week

Second Prize, in addition to a special prize, was won by the Wilmslow and Alderley Edge Gas Company for their entry in the local carnival.

The Price of Gas has been increased by the Ashton-under-Lyne Gas Company from 9d. to 9.8d. per therm. The increase is due to the increased cost of coal and materials and increases in rates of wages due to national awards.

The Lighting Committee of the Annan Town Council reported at a meeting on August 14, that in regard to the renewal of the contract for street lighting, the Annan Gas Company were prepared to undertake the contract at a cost of £695 per annum for a three years' contract, or, alternatively, at £685 per annum for a five years' contract, or £670 per annum for a 10 years' contract. On a division it was agreed that a contract be entered into for three years. The minute was carried by 8 votes to 3.

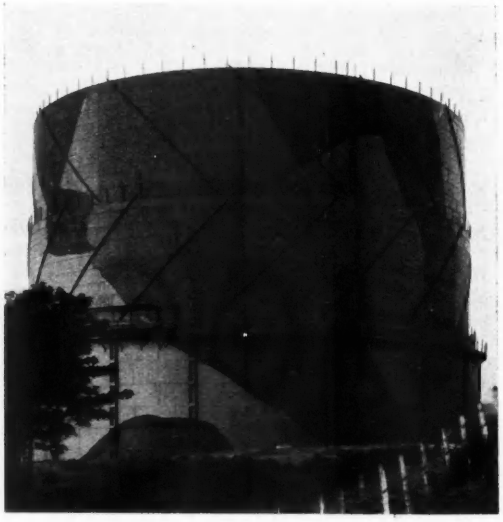
Contracts Have Been Placed, and an immediate start is to be made, with a £12,000 scheme for the extension of Johnstone Burgh Gas-Works to supply 53 million cu.ft. of gas per annum to the Bishopton area. The need for extension arose out of potential requirements of the new Royal Ordnance factory at Bishopton, but while the scheme was under consideration it was agreed to extend the area of supply to Houston and Crosslee districts, through which the 8 in. high-pressure main would pass on its eight mile length between the Johnstone Gas-Works and Bishopton. Rapid progress has been made with the pipe-line, of which four-and-a-half miles have now been laid, and a start has been made with the low-pressure pipe-lines for Houston and Crosslee. Requests have been received that the new gas supply should be laid on to about 1,000 houses which are being erected in Bishopton. The extension involves the erection of new retorts, wet purification plant, scrubbers, condensers, exhausters, and boilers.

Notice was Received from the Leicester Corporation by Market Bosworth R.D.C. on Aug. 16 of the intention of the City Corporation to apply to Parliament for sanction to extend the area of their gas supply powers to the parishes of Nailstone, Barlestone, Osbaston, Market Bosworth, Cadeby, and Peckleton. Market Bosworth are to give notice to the Board of Trade that powers should not be given without some guarantee.

At the Presentation of awards in connexion with the R.S.P.C.A. Annual Horse Show at Leamington, the Hon. Secretary (Capt. H. Harvey) referred to the sporting gesture of the Leamington Priors Gas Company whose employees had declared their willingness to compete against all comers. He was glad to see that they had again had some success. Among the awards for horses with four years' service or over, the property of municipal authorities or public utility undertakings, the Leamington Priors Gas Company secured a "second" (driver C. S. Percox), while for horses having under four years' service, in similar ownership, the Company won both "first" and "second" (drivers F. C. Raven and W. French).

The Refusal of the Commissioner for the Special Areas to make a grant for the purpose has caused Renfrew Town Council to shelve elaborate schemes for the extension of the Burgh Gas Undertaking. At a special meeting the Town Council considered a request from Messrs. Babcock and Wilcox for a largely increased supply of gas which would be required to serve the needs of a large new factory now in course of erection by them. The supply asked for was greater than it was possible for the Town Council to supply with the present plant, and if the Town Council undertook to meet their demands it would be necessary to lay down new plant, including one setting of four retorts. It was agreed that unless a grant could be obtained the Town Council could not feel justified in embarking on an elaborate scheme of Gas-Works extension at the present time.

Camouflaged Holder at Folkestone



The Folkestone Gas and Coke Company have recently completed the camouflaging of this gasholder. The finishing coats were of matt paint to a design which had previously been worked out in detail on a model holder. The Royal Air Force report that this and the other holders blend in very well with the local surroundings when viewed from the air.

Letter to the Editor

The Greater Safety of Gasholders

SIR,—Is not the suggestion of your correspondent, p. 388, "JOURNAL," Aug. 16, based on a wrong premise—that by omitting the roof you likewise omit the space between the roof and the piston? Whether roof, or no-roof, that space remains, and is normally filled with air, it being freely open to the atmosphere.

In the unlikely event of gas escaping past the piston, the gas, in traversing this space is bound to diffuse with the contained air. Considering the functioning of the contained air in this inherent space, as now existing, it is not difficult to realize that owing to (1) the fact that all vents to the outer air are localized at one level (the roof-level), and (2) the great depth of this space (relative to its diameter) when the piston is low down, the contained air, at piston level must be stagnant, and prone to encourage the diffusion, which we desire to prevent. Hence, to attain the greater safety desired, we must look to some modification of this space itself.

Diffusion can be mitigated. Divide vertically this space into two equal compartments, one the equivalent of a circular canvas collapsible, or telescopic, tube, depending centrally from the roof, the other, the annulus thus formed adjacent to the external walls of the gasholder, both compartments of this space, having free access to the outer air, and to be in free communication, one with the other, at piston level.

Thus we shall harness the forces-of-nature to our purpose of greater safety, as a rapid circulation of air will be maintained, descending the relatively cold inner tube, sweeping perpetually across the piston, and ascending the warmer outer annulus adjacent to the sun-warmed outer walls of the gasholder.

Yours, &c.,

H. J. TOOGOOD.

Stoke Pero,

43, Uxbridge Road, Hampton.

Aug. 20, 1939.

Inquest on City Gas Explosion

Adjourned Till Sept. 18

The inquest on the gas explosion and fire in the City on Aug. 4 was opened on Aug. 15 by the Deputy Coroner (Mr. Milner Helme). The explosion destroyed the historic Doctors' Commons building in Godliman Street and caused widespread damage to other property.

Mr. A. T. Miller, K.C., and Mr. Patrick Dean appeared for the Gas Light and Coke Company.

The Coroner said that it was not an ordinary inquest because happily there was no death. The jury would have to consider where and when the fire occurred, how it was caused, and whether there was any felonious intent. It was not a case in which allegations had been made, and he understood that there was no possibility of a criminal charge.

Police-Constable Lansley said that at 8.15 a.m. on Aug. 4 he noticed a strong smell of gas at the corner of Godliman Street and Knightrider Street, and informed the Gas Light and Coke Company. Workmen who arrived soon afterwards opened the carriageway and traced the leak to a fractured 6-in. main. He saw that people did not loiter in the vicinity with lighted cigarettes. He was informed at 12.45 by Mr. Alfred Holt, of the Gas Company, that a temporary repair had been effected, and that a permanent repair would be effected later—probably at the week-end.

Mr. Wilson (for the Metropolitan Water Board): At the time you left at 12.45 did you see any sign of dampness in the cavity which the Gas Company had made?—Not more than is usual in a hole in the ground; it was not bone dry, but there was no sign of anything out of the ordinary.

Mr. Alfred Holt, service layer employed by the Gas Light and Coke Company, said that he received his work book at 7.45 a.m. It contained a reported gas escape at Godliman Street. There was a strong smell of gas in the Post Office boxes and the sewer shaft. The strongest smell was where the crater now is. When he reached Godliman Street no subsidence had occurred. He described how he found and helped repair a fracture in the main, which was "a mere crack," with white lead, bandages, and tape. It was not necessary to cut off the gas. He was filling in his trench when the ground beneath the concrete began to subside and water shot across the gap. He estimated that the hole was about 20 ft. deep.

"Just about 4 o'clock," he said, "one end of the 6-in. main dropped. It was at the place we had repaired it, and it went right down into the hole. That meant gas poured out. We managed to stop the other end of the fracture with clay but we could not bind it for the water was playing too hard on us."

The witness said that he had warned the water company to turn off the water, and the police warned the people to keep clear in case the building collapsed. When they were about 10 yards from the trench they saw a footway in Knightrider Street collapse and a fire alarm disappeared into the ground at the same time. He did not know if the collapse of the fire alarm could have caused a short circuit and flash. The explosion followed almost immediately.

After the jury had visited the scene of the explosion and descended into the crater in the road the inquest was adjourned until Sept. 18.

Teachers of Gas Fitting

Board of Education Course in Nottingham

The third annual course for teachers of Gas Fitting organized by the Board of Education was held at Nottingham University College from July 3-8. Twenty-eight teachers took part in the course, a few other applicants being prevented from attending by illness of their substitutes in the undertakings.

The main purpose of the course was again the improvement of teaching technique. With this end in view there were lectures on Classroom Technique by Mr. L. Orange, Principal of Mansfield Technical College. Instruction in the use of the blackboard, with practical work, was again in the hands of Mr. S. B. Watkins, of the Treforest School of Mines. The instruction in the right use of the voice was revived this year under the direction of Mrs. Ann Whitehead, who rapidly established such close relations with the teachers present that something resembling a public voice clinic was set up. The applications of science to the craft of gas fitting were dealt with by Mr. Norman Tunstall, H.M.I., with abundant experiments.

In the afternoons, a number of visits were paid to local works, Boots' Beeston Factory, Players', the Stanton Pipe Works, and the Royal Ordnance Factory being included. On another afternoon a call was paid at the Gas Department of the City of Nottingham and the new showrooms were much admired. Here Papers were read by two members of the staff (Mr. A. Collard and Mr. J. Winter) giving an account of the recent work in training fitters in Nottingham.

On the evening of July 6 an informal dinner was held at the Hugh Stewart Hall, where most of the teachers were comfortably housed during the course. At this function there were present, besides the teachers and staff of the course, Mr. H. A. S. Wortley, Principal of University College, Nottingham, Mr. Butters, Warden of the Hall, and Mr. George Dixon, Engineer and Manager of the City Gas Department and President of The Institution of Gas Engineers. The Institution was also represented by Mr. John Terrace, Hon. Secretary and Chairman of the Gas Education Committee, and by Dr. W. E. Le B. Diamond, Assistant Secretary. The City and Guilds of London Institute was represented by Lieut.-Col. French, Superintendent of the Department of Technology, by Mr. Kendrick, Examinations Officer, and by Mr. R. N. LeFevre, one of the Examiners in Gas Fitting. After a few brief speeches by the visitors, the company repaired to the common room to hear an inspiring lecture by Principal Wortley.

The course was under the general direction of Dr. P. C. L. Thorne, H.M.I., as in former years.

The gratitude of all concerned is due to University College and the Gas Department for their assistance in making the course a success. The teachers present will go back to their classes with fresh inspiration and with improved methods. Such a stimulating week, moreover, is not without its benefits to their daily work as well as to their teaching; at the course there are constant informal discussions of practice in gas fitting and the methods of different areas are compared and criticized. It is to be hoped that undertakings will continue to release the members of their staffs to attend these courses. The importance of well-trained fitters can hardly be over-emphasized, for the continued prosperity of the Industry is largely dependent on the service they give to the public.

Athletic and Social

South Shields Bowling Success

The Newcastle-upon-Tyne and Gateshead Gas Company's South Shields Branch Bowling Club have realized a long-cherished ambition by winning the Harris Bowling Shield, defeating Cleadon Park in the final by 90 shots to 66. Mr. R. M. Byrne accepted the trophy on behalf of the Gas Company's team.

Newport Allotments Contest

Mr. R. Wilson Bartlett, a Director of the Newport (Mon.) Gas Co., presided at the annual distribution of prizes in the allotments, gardens, and flower competitions which took place at Crindau Gas Works. He was supported by his co-Directors, Mr. G. M. Gill and Mr. C. O. Lloyd, Mr. R. S. Snelling (General Manager and Secretary), and Mr. J. F. Rust (Engineer).

The competitions, promoted by the company, were again extended to cover special prizes given by Mr. R. Wilson Bartlett for the best flower gardens, and entries in this section showed a considerable increase. Mr. Barflett said that it gave the Directors much pleasure again to visit Crindau in connexion with the competition, and to congratulate all who had participated in securing such an excellent show of produce under the difficult conditions experienced, and particularly the lack of sunshine during recent months.

Mr. G. Willey proposed a vote of thanks to the Directors of the Company and to Mr. R. Wilson Bartlett for his special award of prizes. The support given was responsible for the fine show of produce. Mr. P. White, seconding, said they were also very grateful to the Directors for their visit to Crindau. The vote of thanks was carried with acclamation. Mr. R. Wilson Bartlett expressed the appreciation of the Directors, and said it was their wish to give all the help they could.

Gas Engineer Cricketer

The friendly cricket match at the Mayor of Bolton's garden party on Aug. 16 resulted in the Town Clerk's team being defeated by the Town Councillors by one wicket and 89 runs. When the Town Clerk's team's innings closed, Mr. H. Platt, Bolton Gas Engineer, the last man in, had scored 2 not out, and he secured one wicket at a cost of 11 runs.

A.R.P. Notes

Relays for Black-outs

Londex, Ltd., Anerley Works, S.E.20, report that they have received many inquiries and orders for their electro-magnetic relays in connexion with A.R.P. black-outs, and they are preparing a campaign to show works and other engineers their usefulness in this direction. Among the outstanding applications of the relays are emergency lighting, time switches, fire alarms, and temperature control work.

High and Low Temperature Drying As Applied to Various Trades

Paper Read at a Recent Meeting of Industrial Representatives of the Company

By W. J. MANN,
Gas Light and Coke Company

The process of drying may call for the removal of moisture either present on the surface or impregnated in the material, according to its porosity or absorption properties, or the removal of solvents or volatile spirits.

In endeavouring to describe a few of the many processes that have come within my scope, it has been found necessary to describe various procedures adopted throughout the whole process, in order to try to obtain the correct drying procedure in each case.

Low temperature drying of various materials may be carried out at temperatures varying from 70° F. to 250°-300° F.; high temperature drying from 300° to 700° F. The largest proportion of the jobs we meet with are in the low temperature range and often require varying temperatures, which makes gas specially suitable due to its flexibility and ease of control.

Probably the best method of drying is by mechanically inducing hot air through an oven, cupboard, or room; the materials having to be loaded into it at various intervals. For large scale continuous production work conveyor ovens of various sizes are used. This speeds up throughput and allows a more even drying of the materials.

Each drying problem has to be treated on its merits, and the following three factors have to be considered:

(1) The correct drying temperature.
(2) The amount of moisture to be extracted.
(3) The rate of air movement, a factor controlling the relative humidity.

The process of drying calls for various types of gas equipment; these briefly take the form of

(a) Simple type bar pattern burners of various lengths, usually fitted with luminous jets and fitted into the base of ovens or under racks in drying rooms.
(b) Burners heating a block or battery of tubes over which air is passed from a fan. With this method the design of the air heater can be made to include or preclude the products of combustion.
(c) Low pressure burners firing into a combustion chamber from which a large volume of air is heated and extracted by a fan.

Fur Drying

This process is interesting in that it calls for two different procedures. First, in the case of the fur skin dresser who receives the skins in a raw condition direct from abroad, and secondly that of the furrier in making up the skins to the finished wearing apparel.

In the first instance the skins are washed and cleansed of any extraneous material and then dried in such a manner that the dead or long hairs can be easily removed, leaving the short hairs undamaged and giving a good lustre finish. Only radiant heat can be applied in this case so that the roots of the unwanted hairs are shrunk.

The skins are placed on boards, fur uppermost, in front of a source of radiant heat and left for such a period that the above-mentioned effect is obtained. Afterwards they are treated to remove the hairs not required.

The furrier receives the skins, which are then sewn together in this condition, and in order to cut and retain their correct shape and size they are damped, stretched to their respective patterns, and nailed to a large board. They should then be slowly dried, as rapid heating would cause hardening of the skin and cracking.

The earlier method of drying was carried out by placing the boards in front of a coke or gas fire. The best method for this later drying is to place them in an oven or cupboard wherein warm air is circulated.

It will be noted that in these two processes one operation favours radiant and the other circulated convected heat.

Cork Materials and Aluminium Foil

Large quantities of granulated cork, which is waste granules from the manufacture of various cork goods, are compressed in platens with a binder of formaldehyde. These were formerly dried in steam-heated ovens, but gas-heated ovens constructed by Messrs. Sturtevant are now employed very successfully. The temperature to dry the compressed slabs is 220° F. Air re-circulation is employed and the moisture must be completely removed to enable the cork to be cut into thin sheets. Moulded cork goods are similarly compressed and dried.

The many varied designs obtained nowadays on foil wrappings are carried out on special printing machines. The plain foil is fed through embossing rollers, imparting the required design in several colours. It is then passed over a large heated drum forming part of the same machine, and is immediately dried at a temperature of 180° F. by high pressure gas burners which fire in the centre of the drum.

Wax coated foil is dried in a similar manner.

It is interesting to note that this was formerly carried out in Germany, but is now extensively done in this country. With a particular job under review the machines were imported into this country, fitted with electrical heating as standard equipment, but this was scrapped in favour of gas heating, which has proved very successful.

Paints, Varnishes, and Enamels

By this process, generally spoken of as "stoving," the evaporation of moisture or solvents and oxidation of the protective coatings employed, calls for a turbulent atmosphere at a uniform temperature with rapid air movement. Oxidation of the protective coating must be stressed as more important than the actual drying, as a large volume of air must be included. In most cases the products of combustion can be included, although for special requirements they must be omitted from the material treated.

With earlier procedure the standard type of box oven was employed, in which bar burners were fitted at the base, but the temperature in the oven varied according to the distance from the burners, making it impossible to obtain either the amount of gloss or uniformity of colour throughout the oven.

By employing a treble-cased oven, radiation from the floor and walls of the oven is obtained, but even this is not quite satisfactory as complete uniformity of temperature is not attainable.

The best system is to have an oven so constructed that a circulation of heated air is delivered into the oven by ducting. Any proportion of this can be re-circulated as desired, according to the work and loading of the oven. This method is, of course, adapted to present-day ovens, either stationary or conveyor.

Temperatures are employed up to 300° F. for synthetic enamels, and up to 450° F. for Japanning.

Tinplate Drying

The drying of lithographic inks, varnishes, and lacquers requires special heat distribution. The drying process is one of evaporation of the solvents followed by oxidation of the base oil. In the case of inks, a rapid temperature rise is necessary, with a period at the required temperature, while varnishes and lacquers require a slow rise in temperature to prevent a too rapid setting of the surface coating.

It will be seen that the latter process can be efficiently and speedily carried out by a conveyor oven. These ovens are usually over 100 ft. in length and the tinplates are fed in at one end through rollers, giving the required coating of lacquer on both sides simultaneously, and by having the zone of heated air entering at the centre of the oven the plates gradually increase in temperature to their maximum. They are subsequently cooled at the delivery to prevent sticking.

Drying is a very important part in the vitreous enamel process, as it is necessary to dry off the sprayed or dipped work prior to the fusing operation. This is carried out at a temperature of 300° to 400° F.

Core Drying Ovens

In the manufacture of castings the initial preparation of making the necessary moulds and cores is extremely important. Hitherto very little attention has been given to this subject, but in order that core drying should be successful, even drying of the cores must be obtained and setting of the binders without burning, together with the complete removal of moisture, the latter being vital when the molten metal comes into contact with the mould and core.

The drying should be carried out in three periods, the first in an atmosphere with high water content in order that the heat should penetrate into the heart of the core without surface drying. The second period requires the maximum of fresh air when the moisture is evaporated; the third being the oxidation of the binders.

The temperatures required are: (1) Rapid heating with moist atmosphere at 212° F. (2) Slower heating; moderate recirculation of air at 300° F. until surface of core is dry and binders set. (3) Completion of drying at 450° F.

The moisture content of a typical core for casting is 8-10% water and 80% sand and binders. The binders consist usually of molasses, this material being a very viscous residue obtained from sugar manufacture. The procedure recommended is to carry out the drying in three stages.

Whalebone

The raw material whalebone is among the many used in the manufacture of brushes; it is taken from the mouth of the Balein Whale, and is anything from 1 ft. to 12 ft. in length. This is soaked for a time in large tanks of cold water, which softens it. It is then transferred to a large gas-heated tank and further softened by soaking at a temperature of 150° F. This temperature is very important, and the tank is therefore thermostatically controlled.

The whalebone is split into various sizes, and the right quality, texture, and colour are obtained. Throughout the whole of this work it is important that the moisture content is retained. It must then be dried very slowly and evenly. This is done by placing the strands of material on racks in a large drying room.

A very dry atmosphere would spoil the job by making them very brittle. If slow, this part of the process would considerably slow down the production of other departments. Strict control of temperature and humidity is the important factor, together with air circulation.

Various experiments have been made to arrive at the best method of carrying out this process. As an expensive air conditioning plant cannot yet be contemplated, I am carrying out various attempts to obtain a fairly successful result by distributing the heat under racks at floor level and causing a slow air movement by an extractor fan.

The relative humidity and temperature of the air are, of course, checked up at various intervals and the resultant dryness of the material can only be ascertained by the manufacturer by use or experience, as, of course, the finished product is not completely dry in a similar manner to some other commodities.

Colour

Colour used as the basis of pigment for paint manufacture is made in plastic form, and in bulk has the consistency of putty. It has a high moisture content, approximately 80%, and the standard practice of removing the moisture is to pack it on racks or trays in a long oven and blow warm air through the oven at a temperature of 80° to 120° F.

Attempts have been made to increase the rate of drying by considerably increasing the temperature. It was found that this had the effect of baking the outside and sealing it, thus preventing the moisture from leaving the centre of the material. The only way, therefore, to increase the drying output was by increasing the rate of air movement and keeping the temperature low.

Accumulator Plate Drying

Gas has been successfully used for this job in place of steam drying. A paste made of red lead, litharge, and sulphuric acid is pressed into the lead plates already cast in the form of open grids. These plates form the positive and negative plates on the finished accumulator cell.

The whole plate must be thoroughly dried so as to form a rigid structure. Heated air mixed with the products of combustion is passed into the drying chamber, which is thermostatically controlled at 90° F. Strict temperature control is necessary to prevent overheating which would otherwise cause the structure of the plate to disintegrate.

Textile Fabrics

Drying cabinets designed for drying of clothes either in a small hand laundry, shirt and collar manufacturers, or cloakroom, are designed to create air movement without aid of a fan. One type consists of a suitable size cabinet having a heating unit at the base with a bottom flue outlet, sufficient air circulation being obtained by a subsidiary burner fitted in a side flue.

Stone

Large blocks of stone obtained direct from the quarries are cut into slabs with jets of water playing on to the steel blade to clear the cut. The stone absorbs a large quantity of water which must be thoroughly dried before the surface can be polished.

In order to accelerate drying to speed up production, the stone is dried by blowing heated air from a large unit air heater.

Although special apparatus has usually to be constructed for each specified drying job, standard drying equipment is made for a number of processes.

Tar and Ammonia in 1938

The following information is extracted from the report for 1938 of the Chief Inspectors of Alkali, &c., Works (H.M. Stationery Office, price 1s.):

TABLE I.—AMMONIA PRODUCTS MANUFACTURED IN ENGLAND AND WALES.
Expressed as Sulphate (25¾% NH_3)—Tons.

From Liquor Produced in—	1938	1937	1936
Gas-Works	118,900	122,400	120,300
Other Works (including coke ovens, iron works, producer-gas, synthetic, &c.)	558,300	535,600	455,100
Total	677,200	658,000	575,400

NOTE.—Of the above total the equivalent of 109,500 tons was manufactured as concentrated liquor and 33,100 tons of this concentrated liquor was subsequently converted to salts, which are included in the 677,200 tons above. The total quantity of salts of ammonia produced, therefore, was 567,700 tons and the net production of ammonia was 644,100 tons.

TABLE II.—TAR TREATED IN ENGLAND AND WALES—TONS.

Origin.	Tar distilled.	Pitch produced.
Gas-Works	1,050,700	286,800
Coke Ovens	771,500	288,000
Other Works...	31,400	11,100
Total	1,853,600	585,900

NOTE.—Of the above total quantity of tar, it is estimated that 1,132,300 tons were distilled for the production of pitch, the balance of 721,300 tons being treated only for the preparation of road tar, &c.

TABLE III.—SALTS OF AMMONIA MADE IN SCOTLAND.
Expressed as Sulphate.

	1938 tons.	1937 tons.	1936 tons.
Gas-Works	15,639	15,594	13,814
Iron Works	156	278	210
Coke Ovens	8,674	9,672	9,524
Shale Works	25,180	24,679	24,707
	49,649	50,223	48,255

NOTE.—Included in the 1938 total are 1,066 tons recoverable as liquor-ammonia and 63 tons as ammonium chloride.

TABLE IV.—TAR MADE IN SCOTLAND.

	Tar distilled. 1938 tons.	Pitch produced. 1938 tons.	Tar distilled. 1937 tons.	Tar distilled. 1936 tons.
Gas-Works	152,976	38,558	153,502	142,335
Iron Works	3,156	1,591	3,999	2,345
Coke Ovens	27,144	7,949	33,549	28,366
	183,276	48,098	191,050	173,046

Latest Pipe-Line Coating Methods

From a Paper presented to the Annual Convention of the American Gas Association's Natural Gas Section, Tulsa.

By K. N. FANCHER,

Assistant Chief Engineer, Northern Natural Gas Company, Omaha, Neb.

ALTHOUGH highest quality coating materials are important, the solution of the pipe-line corrosion problem depends upon the methods and care with which the materials are applied. Concerted efforts for the prevention of corrosion have produced improved coatings, and more effectual methods of application and inspection. Development of the electrical method of inspection has proved the deficiency of the rolling-rig and canvas-sling hand methods of applying pipe-line coatings. The greater cost for improved coatings, the trend toward application of greater thicknesses, and inability to obtain full effectiveness of coatings when applied by hand methods have produced a definite trend toward machine application. Economies in pipe-line coating require perfect coverage to the proper thickness with the maximum bond strength and the elimination of all waste.

Cleaning, priming, and coating machines, including both stationary and travelling type, have been available and in limited use for several years, but it was not until recently that improvements in design made possible their practicable and economical use in coating large quantities of pipe for cross-country gas and oil lines at the speed necessary to keep up with construction requirements.

Cleaning and Priming

The preparation of the pipe surface is vitally important. The efficiency of the coating and its ability to protect the pipe depends in large degree on the strength of its adherence. The bond between the pipe and coating depends largely upon the condition of the pipe surface and its freedom from any extraneous matter at the time the primer and coating are applied. Continuity of resistance to corrosion depends upon the strength and permanency of the coating bond. Cleaning machines are available, either travelling type or stationary, which are capable of removing not only mill primer, oil, rust, and dirt, but also all mill scale not removed by pickling at the mill or by weathering and rusting in shipment.

The travelling type of cleaning machine consists of a small gasoline engine so mounted on knurled wheels that it propels itself and the cleaning apparatus along the pipe. The engine is connected to and rotates a frame holding ring of small circular cutting tools and steel wire brushes which contact the pipe by spring pressure and perform the cleaning. The pipe is wiped of loose dust and dirt by hand behind the machine. The stationary machines are of similar design except that the pipe is passed through the machine on roller runways instead of the machine riding the pipe.

Priming solution may be applied equally as effectively by hand brushes, spray guns, or machines, the method depending somewhat on whether the pipe is coated by a travelling type machine in the field or by a stationary machine in a central storage yard. The travelling type priming machine is designed in much the same manner as the travelling type cleaning machine, consisting of a small gasoline engine for power with the cleaning apparatus replaced by a rotating frame holding rows of fibre brushes and sections of heavy carpeting for brushing in the primer which is fed to the pipe from a small supply tank mounted above.

Need for Extra Cranes

The use of cleaning and priming machines in the field requires extra travelling cranes. The cost for such equipment, the condition of the pipe-line right-of-way, the facility with which such equipment may be moved, and the extra speed of progress to be obtained must be considered.

The portable cleaning and priming machines, designed for use in the field, lend themselves equally well to installation as stationary machines in a central coating yard. The portable priming machine is very satisfactory, but the greater strength and ruggedness of the larger stationary cleaning machines permit greater speed with fewer delays from breakdowns than with the portable cleaning machines.

The development and use of an electrical method for inspecting applied coatings has had a marked effect upon coating application. By proper and careful use every small pinhole, or other holiday in the coating may be discovered and repaired, thus increasing immeasurably the protection derived from the coating.

The method consists of the application of a high voltage to every point on the coated pipe surface. The pipe being grounded, the current jumps from the inspection instrument to the pipe at every pinhole or holiday. The resulting spark can easily be heard and seen, and the place marked for repair.

The inspection instrument comprises a circular row of fine steel whiskers approximately 4 in. long held in a metal flame attached to an insulated handle. The loose ends of the whiskers form a circle having the same diameter as the coated pipe on which the instrument is used. The metal frame is connected to a high-voltage power supply by means of a wire of sufficient length to permit reaching every part of a 40-ft. joint. To eliminate danger in its use, the high voltage applied must carry very little amperage. Various means have been used for providing such voltage.

The electrical inspection instrument indicates every miss in the coating, but, of course, will not disclose any lack of bond between pipe and coating. An instrument is needed for determining the location of such defect in the application, and along with the present ability to determine absence of coverage should provide for complete effectiveness of the coating.

Machine Application in Field

Several different designs of both stationary and travelling type coating machines are now in quite general use. There are three principal designs of the travelling type machine, all three of which are motor driven and operated, but each contains certain distinguishing features. One comprises a small gasoline engine, a coating head or shoe, and a large heating tank with oil burners and agitating device, which also serves as a catch pan for the excess from the coating head. The engine propels the machine along the line, and drives the pump which supplies the coating head. The coating head or coating shoe, into which the coating is introduced under pressure, consists of a segmented circular aluminium casting which encircles the pipe and is adjustable so that a uniform coating of any desired thickness may be applied. The design is such that the uniformity of coating thickness is not affected by vibration, swinging, or other disturbance of the pipe-line. The segmented shoe expands and passes over welds and even ordinary patches such as found on reconditioned pipe. The machine passes over and coats all ordinary pipe bends. By means of the auxiliary burners on the combination heating tank and catch pan, application temperatures may be accurately controlled. The agitator or stirring device may be operated whether the machine is in operation or idle. The coating pump insures a steady flow of coating from the coating head to the pipe. Surplus coating flows back to the tank, preventing waste of material. There are no tears, drips or bubbles, and misses or holidays in the coating are almost eliminated.

With this machine it is possible to apply two thin coats rather than one thick coat by providing one machine with two coating heads. The weight of the machine precludes its use on pipe less than 6 in. in diameter unless set up and used as a stationary unit at a central location. No wrapping device has yet been incorporated on the machine, and therefore, where wrapping is to be applied, a squirrel cage wrapping machine must be separately used.

A second and somewhat similar travelling type coating machine is so designed that the coating is pumped from a small catch pan to an overhead hopper from which the coating is fed into a coating shoe. The coating head or shoe and

the entire machine is mounted on a wheel arrangement by which is regulated the spacing between shoe and pipe, and thus the coating thickness. This machine also includes a wrapping device, installed in such a position that the wrapper necessarily bonds with the coating. If an unbonded wrapper is desired, unless one wrap of Kraft paper is applied under the felt to prevent bonding, a squirrel cage wrapping machine must be separately used. Due principally to the small size of the catch pan and the lack of auxiliary burners or agitating device, this machine is much lighter and may be used on pipe of 4 in. diameter and larger. With the wrapping device removed, it possibly could be used on lines of 2 in. and 3 in. diameter. Field welds, pipe bends, repair patches, and so forth, present no difficulty in its use.

Inspection Necessary

Although the application of the wrapper with this machine tends to eliminate pin holes and bubbles, inspection of the coating must be made through the wrapper with resulting expense for repairs. There is danger that the tension of the springs in the wrapping head might cause reduction of coating thickness on the pipe wall and its entire removal from field welds and outside longitudinal seams.

The third design differs materially from the other two. The machine is propelled by a small gasoline engine and comprises a hopper located above the pipe and large enough to maintain a constant flow of coating to the top of the pipe. Coating preheated in auxiliary kettles to the proper temperature is transferred by buckets into the hopper. A corrugated metal form in a nature of a sling fits around the bottom of the pipe, and by a connexion to the engine is driven back and forth horizontally at right-angles to the pipe. This sling insures coverage of the bottom half, the coating thickness being controlled by temperature. All excess coating material is caught in individual catch pans carried along for the purpose.

The machine is of simple construction, light in weight, and easily removed from and replaced on the pipe. The machine has been used on pipe sizes varying from 6 in. to 16 in. Where a wrapping is to be applied it must be followed by a squirrel cage wrapping machine. It has the advantage that inspection of the coating may be made before the wrapper is applied and the disadvantage of possible variation in application temperatures with resulting variation in coating thickness.

The first two designs of travelling type machines mentioned may and have been used as stationary machines in central coating yards. It is possible that the third might be used in the same manner.

Railhead or Yard Coating

The coating machines specially designed for stationary use consist of gasoline engines connected to devices which simultaneously rotate and propel the pipe through the machine, a large coating reservoir of catch tank provided with an agitating or stirring mechanism, oil burners for maintaining proper coating temperature, and a pump for pumping the coating to a feed arrangement above the pipe over the coating reservoir. As the pipe rotates and passes through the machine a spreader arrangement smooths out the coating as it pours on the pipe. The thickness of the coating is controlled by the temperature at which it is applied. Such machines are in common use at pipe mills or in central coating yards near railroad sidings.

The use of coating machines in a yard at a railroad siding entails the selection of a suitable site. The pipe diameter, maximum and minimum lengths of pipe joints, the estimated speed of pipe stringing, probable weather conditions, accessibility to trucks for loading, location with reference to the proposed pipe line, and fire hazards are items which must be considered. The pipe joint length and diameter partly control the size of the site required, as are the speed of stringing and the possible weather conditions. The site should be large enough to provide ample storage space for uncoated pipe to prevent large demurrage payments in the event weather halts yard operations. Storage space for coated pipe in the event weather permits yard operation but not pipe stringing, should be provided. In addition to storage, the site must offer sufficient space for cleaning and priming operations and the installation of machines if desired with adequate skidways and roller runways for moving and handling the pipe between the unloading, cleaning, priming, coating, and loading operations. The larger in diameter and length and the greater the probability of delays, the larger the space should be.

Where possible the skidways and machines should be set at such grade that gravity will assist the movement of the pipe through the yard and prevent the need for raising pipe from one grade to another during progress of the work. The outlet skidways for the coated pipe should be at such height that the pipe joints may be rolled directly upon the stringing trucks. The yard should be arranged so that there is no wasted space.

Procedure

Pipe is unloaded to the skidways adjacent to the cleaning machine. After passing from these skidways on roller runways through the cleaning machine, it is rolled upon skidways from which it passes through the priming machine or on which it is primed by hand brushes or spray guns. As the primer dries, it is rolled upon other roller runways by means of which it is passed to the coating machine. As the pipe emerges from the coating machine, the coating may be cooled by a water spray, if water is available and such cooling is desired and necessary. While the pipe is rotating as it comes from the coating machine, a wrapper, bonded or unbonded, may be applied. From the roller runways at the coating machine outlet the pipe is rolled upon skidways where the electrical inspection for holidays is made and such defects repaired. After inspection and repair the pipe is loaded for stringing.

Where lesser quantities of 2 in. to 4 in. diameter pipe are to be coated, coating by dipping at a railroad location has been found very economical and successful. The yard is arranged in the same way as for machine application, continuous skidways being provided to and from cleaning and priming machines if such are used, and to a dipping trough constructed of an 18 in. or 20 in. pipe joint cut in half longitudinally with one-half closed at the ends. A combustion chamber is formed by supporting the trough over a ditch with three or four burners installed at intervals for maintaining the coating at the proper temperature. The cleaned and primed pipe is moved to the trough on skidways from which it is raised, dipped, and set out on other skidways on the opposite side of the trough. This is accomplished by a rigging comprised of a lever on a swivel with a swinging cap closing up the pipe and supported by a chain from the outer end of the lever. In such a yard properly planned, small pipe can be cleaned, primed, and coated at a very small cost for labour and with no waste of materials. Small pipe may be wrapped with a squirrel cage wrapping machine on the skidways after completion of the coating.

Wrapping

Where the pipe for an all-welded line is to be coated by a travelling type machine and is to be further protected by the application of a wrapper, the wrapper may be applied by the coating machine if so designed, otherwise by a squirrel cage wrapping machine.

Some undertakings require that each field joint be tested under pressure with soap suds in which instance the wrapper must be left off the field joints until after testing is completed, thus forcing the application of the wrapper over field joints to be made in the ditch unless the testing is done before lowering. The wrapper must be cut and fastened at each weld, and an additional short length applied around the weld after testing.

Where pipe is coated in a central storage yard, the wrapper may be applied in the yard as the pipe emerges from the coating machine, or in the field by means of either a saddle or squirrel cage type machine. Application in the yard at the coating machine obviously is the most economical method.

The electrical inspection must be made over the wrapper and the cost of any repair work is increased by reason of the necessity for removal and replacement of the wrapper. Where the number of holidays is large the benefit of an unbonded wrapper is lost along with some of the quality of the job. The hauling and stringing of coated and unbonded wrapped pipe has been done successfully without any special precaution, and the wrapper in such instance helps prevent damage to the coating during the hauling, stringing, and other operations.

Where the pipe for a Dresser coupled or combination Dresser coupled and welded line is to be coated with a travelling type machine and further protected by a wrapper, such wrapper application may also be accomplished by the coating machine, if so designed, or by a separate wrapping machine. Both the wrapper and coating, however, must be stopped at a sufficient distance from the ends of the joints that the coupling coating pan will contact only a primed surface, leaving the coating and wrapping of the pipe at each side of the coupling to be done by hand before lowering. Due to the fact that the pipe joints should be welded before the cleaning and priming operations, the wrapper over intermediate welds must be removed for testing, and replaced. The delays and complications due to the application of a wrapper in addition to the coating are likely to make the use of the travelling type coating machine on this type of construction uneconomical as compared with the railhead method.

Superiority of Mechanical Methods

Experience to date in the use of machines for application of pipe-line coatings has definitely shown the superiority of mechanical methods over hand methods. The determination of the proper method of application must be preceded by a consideration of the conditions particular to each pipe-line job. The type of construction, whether welded or coupled, length of line to be coated, whether to be shielded, the topography of the land over which the line is to be built, the number of railroad, highway, creek and slough crossings and the ease with which equipment may be moved over the line together with the question of whether the soil will permit operation of equipment near the ditch without caving, are important considerations.

The use of a travelling type machine may easily prove uneconomical on a comparatively short line encountering a large number of obstructions, because of the necessity of frequent removals and replacement of the machine, and the relatively large portion of line necessary to be coated by hand. The use of such a machine requires that both manual labour and equipment work along side of the ditch, and therefore it should not be employed on any line where the movement of equipment is difficult for any comparatively large portion of its length. Where the heating kettles, tractor cranes, trucks, and so forth, necessary in connection with the travelling type machines, cannot be moved at the desirable speed, the storage yard method of coating should be considered. Where the line is to be constructed over territory presenting no difficulty in the movement of such equipment, the cost for the extra equipment necessary for the operation of a field travelling machine and the progress probable with such method must be compared with the cost of setting up and operating a coating yard at a railroad siding.

On solid welded lines the travelling type machine permits construction of the line ready for lowering in before application of the coating, thus eliminating any extra expense for special care in handling coated pipe. After the pipe has been welded and laid on skids over the ditch, it may be cleaned, primed and coated, wrapped, electrically inspected, and lowered in immediately. If slack loops are held on the skids after coating is applied, adequate padding must be used between pipe and skids to prevent damage to the coating until the slack loops are put down. This method eliminates the extra cost for coating and wrapping pipe left bare for welding, and the cost for repairing such damage, as may occur in the stringing, welding and laying operations, to pipe coated in a central location.

Difficulty of Obtaining Clean Surface

The use of the travelling type machine presents the difficulty of obtaining a clean pipe surface for the application of the primer and coating. The movement of equipment incident to the operation of cleaning, priming and coating machines, and the operation of cars and trucks adjacent to the pipe line, produces such quantities of dust or splashing of mud as makes virtually impossible clean surfaces for either the primer or coating. The quality of the application is certain to be reduced.

The use of the travelling type machine, while most advantageous on welded lines, is not eliminated by the use of Dresser couplings. On lines to be joined by Dresser couplings or by combination of welds and couplings, thin walled cylindrical steel sleeves over which the machine will travel, are used for temporarily connecting the pipe joints or sections for the cleaning, priming, and coating operations. The line is supported a few joints or sections at a time by a tractor crane to permit passage of the machine. After the joint or section is cleaned or primed or coated, a separate tractor crane must be used for removing it endwise and lowering to the skids over the ditch, the sleeves being carried forward and used over again. The electrical inspection is made after the line is finally connected before lowering in.

The railhead coating yard method for applying protective coatings may be used on either welded or Dresser coupled lines. Special care must be used in the various operations in the field to prevent damage to the coating. If the line is to be welded by the firing line method, special dollies having large rubber-covered rollers must be provided to prevent damage to the coating during the welding operation. The sag of 40 ft. pipe joints of diameters up to 16 in., unless the pipe has an unusually thick wall, may cause checked welds when roll welded on dollies placed at the ends of the joints. Coated pipe of 16 in. diameter and larger has been successfully roll welded electrically on dollies placed at the end. For this reason the stove pipe method is more desirable, on lines of welded construction.

No Damage Caused by Handling

Experience with storage yard or railhead coating has shown that the handling of coated pipe in stringing, hauling, welding, and other operations may be accomplished without any appreciable damage to the coating. By padding truck bolsters, tractor and hoist slings, and the skids on which pipe is strung and laid, there is no occasion for damage if ordinary care is exercised.

The use of the storage yard method leaves the coating of welded joints and bends to be accomplished in the field. Pipe ends left bare for welding and for installation of couplings and pipe bent in the field must be coated by means of canvas slings. The coupling bolts, followers, and centre rings are cleaned and primed in the yard, but the coupling coating is applied in the field by the pan method. Field pipe bends necessitate the destruction of several feet of coating at each bend, and such pipe must be recleaned, reprimed, and recoated by hand methods. This is a distinct disadvantage where the country is rolling or rough, and the number of field bends per mile is high. Consideration must be given to this as such replacement may amount to as high as 10%. In flat country where there are few bends this item is not important.

The storage yard of railhead method makes less difficult the provision of clean surfaces for priming and coating, and permits shutdowns of operation during unfavourable weather conditions without delay of construction work in the field. When the speed of construction warrants, the coating yard may be operated in shifts and otherwise designed and planned to meet any speed of construction.

Accurate Control and Inspection

Conditions in the coating yard permit of accurate control and inspection, including application temperatures, and permit a minimum of waste. The fact that a reservoir of coated pipe may be accumulated in the yard is advantageous in that it tends to prevent delays caused by breakdowns of equipment incident to the coating operation in the field or due to any lack of progress in the field operation.

The application of two thin coats is widely considered more desirable than one thick coat, two coats providing less opportunity for pin holes and other holidays. The stationary machine in a railhead yard lends itself to such procedure. The storage yard permits the use of larger and more rugged equipment with fewer breakdowns, the stationary cleaning machines being capable of removing all rust and pipe scale to a bright clean surface for application of the primer.

The construction of almost every pipe line presents a different combination of conditions and circumstances. Choice of coating application methods should be made on the basis of quality and cost. The cost for coating in a yard, with all the advantages of control but with the attendant destruction and loss of coating at field bends, must be compared to costs for operating machines in the field with their advantages and inconveniences under certain conditions. Due to elimination of waste, control of thickness, and speed of operation, machine methods permit more accurate advance determination of costs and control of quality.

Supplying Town Gas Without Storage

By R. McN. BRAZIER,
Assistant Engineer, Wollongong,
Gaslight Company, Ltd., N.S.W.

MUCH attention has been given recently to various phases of A.R.P. for gas undertakings, and thought must naturally turn to the most conspicuous item of plant, the gasholder. Its size renders effective concealment difficult, though no doubt forms of camouflage have been, and will be, devised. However, the result of a direct hit during an air raid must be considered, and particularly on the smaller works where there may be only one holder, or perhaps two.

As determined attemps will be made, in case of war, to break the morale of the civilian population, the maintenance of supplies by the various essential public utilities—water, gas, electricity—will help in a large measure to create confidence in the minds of the public, even if those supplies are in only a skeleton form.

At Hay, in New South Wales, Australia, the Colonial Gas Association, Ltd., controls a very small gas-works (make for 1938, 6¼ million cu.ft.), at which there is only one gasholder, of capacity 14,000 cu.ft. The writer had recently to assist the Manager at Hay to maintain a supply of gas to the town without a gasholder for a period of just over three weeks, while the old holder bell, in very bad repair, was removed and replaced in the same tank by a new bell.

Notwithstanding that the Hay Gas Undertaking is very small, it is thought that the experience secured there in working without a holder would be useful for larger works if they, too, had to carry on a gas supply after their storage plant was disabled during air raids. With this in mind, the following account has been prepared indicating the adopted method of working and the difficulties encountered. It is not anticipated that these methods and experiences are original, but they appear to have special significance at the present time, and they are submitted as a humble contribution to the memoranda dealing with A.R.P. work.

Pressure Controller

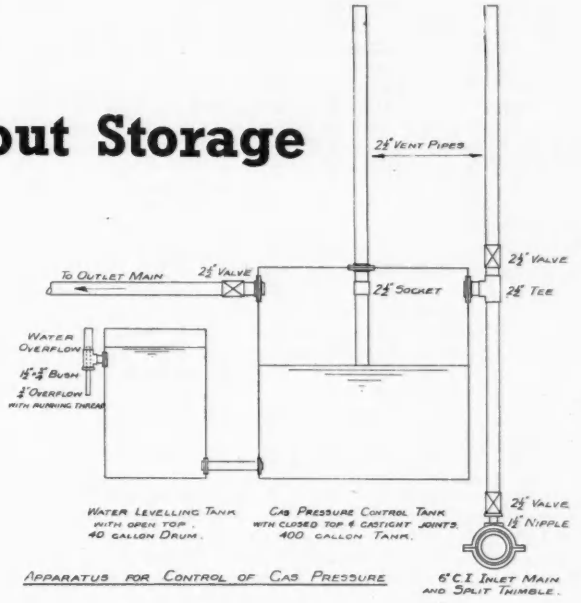
The apparatus used to control the pressure on the district mains took the form shown in the accompanying sketch. This arrangement had previously been used on similar jobs by Messrs. J. F. Thomson Pty., Ltd., the contractors for the erection of the gasholder bell.

A gas-tight 400-gallon tank was connected in a 2½ in. by-pass from the inlet to the outlet main (each of 6 in. C.I.) of the gasholder. The actual connexions in these mains were 1½ in. gas tapped through cast-iron split thimbles bolted on. Two 2½ in. vent pipes were provided ; the first screwing through a bushing on the top of the tank and sealed by water at an adjustable level so that when the gas pressure rose to a predetermined figure, excess gas was automatically blown through the vent ; the second on a tee on the inlet pipe and controlled by a valve.

The aim was at all times to make gas at a rate slightly greater than the town's requirements, the excess bubbling to atmosphere through the water seal and dispersing at a safe height of about 9 ft. above ground level. The second valve-controlled vent was for emergency use, in case the water-sealed vent should not deliver sufficient gas to relieve high pressures. The water seal was originally set at 4 in. Modifications of the above apparatus to deal with larger outputs will readily suggest themselves.

Plant at Hay

The retort plant available consisted of two direct-fired settings each of four 22 in. by 14 in. by 9 ft. 4 in. stop-ended fireclay retorts. Surplus retort plant is essential to carry on successfully this method of working, and the two settings were ready for gasmaking throughout, although actually one setting


2½" Vent Pipes
2½" Valve
To Outlet Main
2½" Valve
2½" Socket
2½" Tee
Water Overflow
1½"-¾" Bush
¾" Overflow with running thread
2½" Valve
1½" Nipple
Water Levelling Tank with open top. 40 gallon Drum.
Gas Pressure Control Tank with closed top & gastight joints. 400 gallon Tank.
6" C.I. Inlet Main and Split Thimble.

Apparatus for Control of Gas Pressure

easily coped with all requirements, including a peak output of about 1,800 cu.ft. per hour.

The exhausting plant consisted of one rotary blade exhauster of capacity about 3,000 cu.ft. per hour, belt-driven through a countershaft by either of two gas engines or by an electric motor. In normal running a gas engine was used, and the belt was left on the motor, which was therefore turning over with the power off. In case of a stoppage of the gas engine, its belt could be thrown off and the motor switched on without appreciable reduction of the town's pressure. Although the electric motor, generally speaking, gives more uniform running and requires less attention, if it should stop the gas engine takes considerably longer to start, and it is possible that the pressure may fall to such an extent that not sufficient gas would be available to start the engine. Further, a gas engine almost invariably gives warning by "labouring" or "missing" before it finally stops, and when working without gas storage every second is valuable in case of emergency. Every second evening the electric motor was switched on for about an hour while the plugs and valves of the engine were cleaned.

Essentials of Working

The technique of working is entirely new to one who has always had reserve supply in a gasholder. It must be remembered that the exhauster cannot stop, even for a matter of seconds, without the pressure on the town falling, possibly to zero, and further, as the mixing effect of the holder is absent, the calorific value must at all times be kept within reasonable limits.

There are some points to be particularly watched. First, as the diluent necessary to control calorific values is introduced by "over-exhausting" and as at peak times the rate of gasmaking is large compared with the normal maximum rate when working with a holder, the suction at the exhauster inlet and the "pull" on the retorts must be of the order of some inches water gauge, unless the retort walls are particularly unsound, to prevent excessively high calorific values. Leaks around mouth-pieces and retort lids, which would normally be of small importance, will draw a large amount of air which, burning with the coal gas, will quickly block the ascension and bridge pipes. Lids should therefore be tight, being "clayed up" after each charge if necessary, and the largest possible auger should be pushed up the ascension pipe each time a charge is drawn. The caps should be taken off the bridges at regular intervals during off-peak hours, and the pitch or tar chipped or burned out.

Secondly, the suction at the exhauster inlet should be reduced as much as possible while the retort is open for draw-

ing or charging, to prevent air being drawn in quantities large enough to reduce the calorific value below a fair working value. A point to remember here is that the rate of gas-making decreases steadily from when one retort is charged until just before the next. If the seal on the controller is set at, say, 4 in. water gauge, and three inches is decided as the minimum allowable pressure, the amount of gas being blown to waste through the seal will normally be greatest just after charging and will decrease until none is blown when the rate of gasmaking equals the rate of output or consumption. The pressure will then fall steadily until the next retort is charged. The aim should be always to have a retort standing empty ready to be charged immediately it is required, and this should be charged before the minimum pressure of 3 in. is reached as the rate of pressure drop will increase while the "pull" is reduced for drawing or charging.

Thirdly, when changing a purifier—and the oxide must never be allowed to foul excessively in the box, causing increased back-pressure and risk of blockage—it is essential to purge thoroughly before the box is re-connected in rotation. Any air, if left in the box, may put out burners and pilots all over the district.

On the question of pressure, a difficulty experienced at Hay was the violent fluctuation caused by the excess gas bubbling through the vent pipe seal. This was accentuated by the flexure of the top of the 400 gallon tank, the centre of which lifted at least half-an-inch, and with it the vent pipe, as the pressure increased to blowing point. No doubt a certain wave action on the water surface also increased the pressure variations. While maintaining an average pressure of 3 in. water gauge, the fluctuation between 2 in. and 5 in. was far too great for satisfactory burner performance. This was overcome by using the valve-controlled vent pipe as the normal pressure relief, the valve being gradually closed as the rate of gas-making decreased, and the water-sealed vent acting as a safety valve. However, unless the valve is carefully watched and regulated there is a risk of the pressure being allowed to fall below a safe minimum. Probably bracing the top of the controller to prevent the excessive flexure would keep the fluctuations within reasonable limits on the district mains.

Air Raid Precautions

The possible application of the foregoing to the case of a small works whose gasholders have been disabled during air raids should be obvious. The apparatus required additional to normal stocks is simple and comparatively cheap—a 400 gallon tank with suitable flanged bosses bolted on to match the necessary pipe connexions; screwed valves on the inlet and outlet of the tank and on one vent; sufficient screwed pipe and fittings of a suitable size to connect the controller between gasholder inlet and outlet mains. A calorific value indicator and a pressure gauge on the outlet of the controller are the guides by which the attendant regulates the rate of gasmaking.

When a little experience has been gained working under the strange conditions, a supply may be maintained at a steady pressure and with calorific value varying plus or minus 50 B.Th.U. from the standard.

The writer's thanks are due to the Colonial Gas Association, Ltd., for permission to forward this article, to Messrs. J. F. Thomson Pty., Ltd., the Australian agents for Clayton & Sons, who introduced to him the type of pressure controller employed, and to the Manager at Hay with whom he shared the experience of employing these methods under actual working conditions.

TRADE NEWS

Welfare at Stanton

Working conditions are exceptionally well-planned at the works of the Stanton Ironworks Co., Ltd., the largest producers of cast-iron pipes in the world. A copiously illustrated 24-page brochure, "Welfare at Stanton and Some Stanton Products," just received from the Company, recalls how the formation of the first works committee in 1919 marked the inception of a welfare system which has so developed to-day that it is able to meet the needs of 14,000 employees, each of whom has, through his appropriate committee, a channel of direct access to the management. While the works committees in no way encroach upon the legitimate functions of the trade unions, they deal from time to time with any differences between the management and the men, and in practice it has been found that by giving employees an opportunity to meet the management at regular intervals any differences can usually be settled before they have had time to develop into grievances. Ambulance work, canteens, pit-head baths, evening study facilities, and well-organized sports clubs all contribute to the health and contentment of the workpeople, while a modern club house, with lounge and billiard room, is at the disposal of the office staff. Dealing with products, the brochure mentions that over 29,000 miles of Stanton spun-iron pipes are to-day in use in all parts of the world. A special department of the concrete plant is devoted to the manufacture of reinforced concrete lamp columns. The Stanton Company's eleven blast furnaces—five at Stanton, four at Holwell, and two at Wellingborough—claim to contribute more foundry pig-iron to the free market than any other firm in Great Britain.

Neckar Water Treatment Systems

Several of the leading gas undertakings are mentioned as users in a survey of the application of Neckar Water Treatment Systems published as an illustrated booklet by the Neckar Water Softener Co., Ltd., Artillery House, S.W. 1. The supply of correctly conditioned water for boiler feed purposes is acknowledged to be one of the most important factors in the economical and trouble-free operation of a boiler plant, and it is recognized to-day that the problem is a much bigger one than that of softening the water, consisting of conditioning the water so that it is in every way as suitable as possible for boiler feed purposes. The technical aspects of water treatment are dealt with in separate publications issued by the Company, which has established a comprehensive service department, giving free service to each plant for the first twelve months of operation.

British Aluminium Co., Ltd.

The British Aluminium Co., Ltd., will be removing their Head Office from Adelaide House, King William Street, London, E.C.4, to new and larger quarters at Norfolk House, St. James's Square, London, S.W.1; as from Sept. 18. The telephone number will be Whitehall 7822 (private branch exchange). Telegraphic address: "Cryolite, Piccy, London." Cables: "Cryolite, London." This new Head Office will be the registered address of the Company.

A New Type of Portable Heater

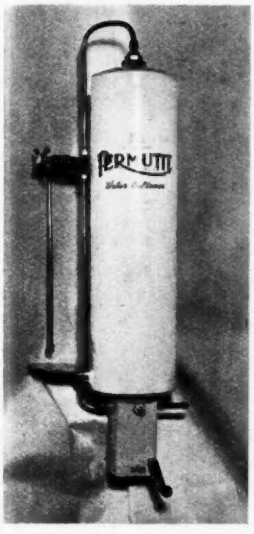
A new development by Arthur Docking and Company, of Harmood Street, N.W. 1, employs in a portable domestic gas heater the principle of the well-known oil heater, the use of which is still very popular to-day. The adaptation of this design of appliance to gas firing brings with it an entirely new method of burning gas and provides the Industry with an efficient and attractive portable heater embodying many interesting features.

The burner, which was designed and patented by Mr. Arthur Docking after a lot of research work, is of the luminous flame type, and in a room of average size, with the heater burning 13.5 cu.ft. per hour, the CO_2 content has been independently tested at 1.8%. The total air for combustion is induced by the pull of the chimney, the air being supplied to the flame both internally and externally. A large volume of free air is also admitted, which is heated by its passage through the heater. The burner head is made of porous refractory material which causes the gas to burn with an even and steady flame, added to which it is claimed considerably to prolong the life of the burner.

We understand that this heater has been tested by several gas undertakings, and the reports have been very favourable. The makers have issued a leaflet giving particulars and illustrating in colour the various designs available, while a showcard has been produced for showroom use. It is also their intention to undertake an advertising campaign in the popular monthly magazines before and during the coming heating season.

New Line in Water Softeners

Designed primarily for use with water heaters, the "Permutit" D.H. water softener has been introduced by the Permutit Company, Ltd., Gunnersbury Avenue, W.4, in a pleasing white finish with chromium plated fittings and capable of being fixed on any wall. The softener works on the usual base exchange principle, and the only care it requires is regenerating at intervals with common salt. It is provided with a single control valve to carry out the regeneration and the whole process can be effected merely by turning one handle in a certain sequence. It is pressure-proof and is constructed to withstand a pressure of 125 lb. per sq. in. No weighing of salt is necessary as a specially marked jar is provided so that it can be easily measured. The softener is made in two capacities, Model 2 being capable of softening twice as much water between regenerations as Model 1, which is of similar dimensions, excepting that it is 6 in. shorter and 6 lb. lighter. Softening capacity, of course, depends on the degree of hardness to be removed. At 16° the softening capacities between regenerations are 150 and 75 gal. respectively for the two models; at 10°, 240 and 120 gal., and at 24°, 100 and 50 gal. respectively. Only 2 lb. of salt is used per regeneration in the larger model and 1 lb. in the smaller.



Gas Heated Solder Bath

Some of the largest food packers in the country have installed Smith's patent universal gas-heated treadle-operated solder baths, developed by Moon Brothers, Ltd., 36, Victoria Street, S.W.1, for the soldering of the end seams of cans, more particularly those of unusual shape, though ordinary shapes can be handled with equal ease. The solder bath obviates the costs and waste occurring in hand soldering those cans, either full or empty, for which no fully automatic machine is available. A thermostat gas control is supplied to maintain the solder temperature at the efficient range, and a thermometer is provided as a guide when starting-up and as a constant check on the automatic control. Immersion of the seam into the solder by means of a treadle-operated cam produces a conformity of neat work independent of the human element. The machine is capable of dealing with cans of irregular size up to 9¼ in. by 11 in. and round cans up to 10 in. diameter, and has an output of 175 cans per hour. It occupies a floor space of 28 by 30 in. and weighs 365 lb. when empty. The solder bath holds 125 lb. of solder.

Slippery Coatings in Engineering

In how many industries and applications is colloidal graphite used as a lubricant to-day? The answer would surprise even engineers and research workers who used the product themselves; and with the object of providing a comprehensive reference Messrs. E. G. Acheson, Ltd., Thames House, S.W.1, have issued a new Technical Bulletin, No. 270, on the subject. The Bulletin covers the use of "dag" colloidal graphite in various dispersions and shows how graphite films so formed can be applied to advantage in many sections of industry. From the point of view of the Gas Industry the most outstanding advantage is the high-temperature qualities of such slippery films. The subject is dealt with under various headings. Thus, there is a section dealing with metals, another with glass, while separate treatment is given to miscellaneous surfaces and special coatings. Under the heading of metals is described the use of colloidal graphite in oil as a lubricant for forming anti-friction surfaces on the working faces of engines, gears, and other industrial equipment. An interesting application not generally known is that of dipping metal parts in a hot dispersion of "dag" colloidal graphite in water to provide dry self-lubricating surfaces. The solution may also be swabbed on, brushed or sprayed on, the resulting slippery film offering a high degree of protection for the metallic and non-metallic surfaces treated in this way.

Hugh Wood and Co., Ltd.

We are obliged to Messrs. Hugh Wood & Co., Ltd., Team Valley Trading Estate, Gateshead-on-Tyne, for a copy of their blotter for August and September. The subject matter is the firm's "Cardox."

Better Fruit Bottling

Some people regard fruit bottling as a difficult and tiresome business, but the new Radiation booklet, "Better Fruit Bottling," available free of charge to all gas undertakings, reveals that with the aid of the modern gas oven the process is not only very easy but of considerable advantage to the thrifty housewife. Those who have only a few trees may gather fruit a little at a time as it becomes ready, and those without home-grown fruit may yet find it economical to bottle fruit when it is cheap and plentiful. Food storage on these lines is of particular significance in the present situation, and the booklet is therefore assured of a big circulation.

Pulsometer Steam Pumps

A booklet recently published by the Pulsometer Engineering Co., Ltd., of 39, Victoria Street, S.W.1, gives full particulars of the firm's ranges of steam pumps for various purposes. The Pulsometer steam pump has no moving parts except the valves, which are of an exceedingly simple type and can be readily replaced by unskilled labour. There being no frictional surfaces to cut out, the "Pulsometer" pump will raise dirty water with far less wear and tear than any other form of pump. There is no exhaust steam; the steam, having done its work in forcing the water out of the pump, is condensed, and the vacuum thus formed draws more water into the pump.

The "Pulsometer" steam pump, being self-contained, requires no foundations, and can be slung on a chain. No lubrication or packing is required. The standard pattern is suitable for 90 ft. vertical lift, and every pump is actually tested on this lift before being despatched. The special pattern is suitable for heads up to 150 ft. For higher heads pumps are employed in tandem. The "Pulsometer" steam pump is essentially one that will stand rough usage, and does not require skilled attention.

The booklet also deals with the "Pulsometer" trailer fire pump, capable of delivering 250/350 gal. per minute at a pressure of 136/85 lb. respectively, and of delivering four efficient fire-fighting jets. The pump is self-priming.

Fifty Years of Engineering

To commemorate the fiftieth year of W. Sisson & Co., Ltd., which began in 1889 and became a limited company in 1904, the Directors have issued a 16-page brochure reviewing the history of the Company and illustrating some of its principal productions. Many engines have been supplied to gas-works, where the utilization of waste heat has provided a cheap source of steam and has encouraged the use of steam prime movers. Among the illustrations is a picture of the power house of the carbonizing plant at Weston-super-Mare Gas-Works, showing three Sissons engines, each direct coupled to a dynamo.

Modern Machinery by Head, Wrightson

After almost a century of designing and manufacturing blast furnaces and auxiliary equipment, Messrs. Head, Wrightson are to-day recognized specialists, and they have just published a folder illustrating some of the various stages in improved design. There are reproduced in the folder some very impressive photographs of the modern machinery manufactured by the firm.

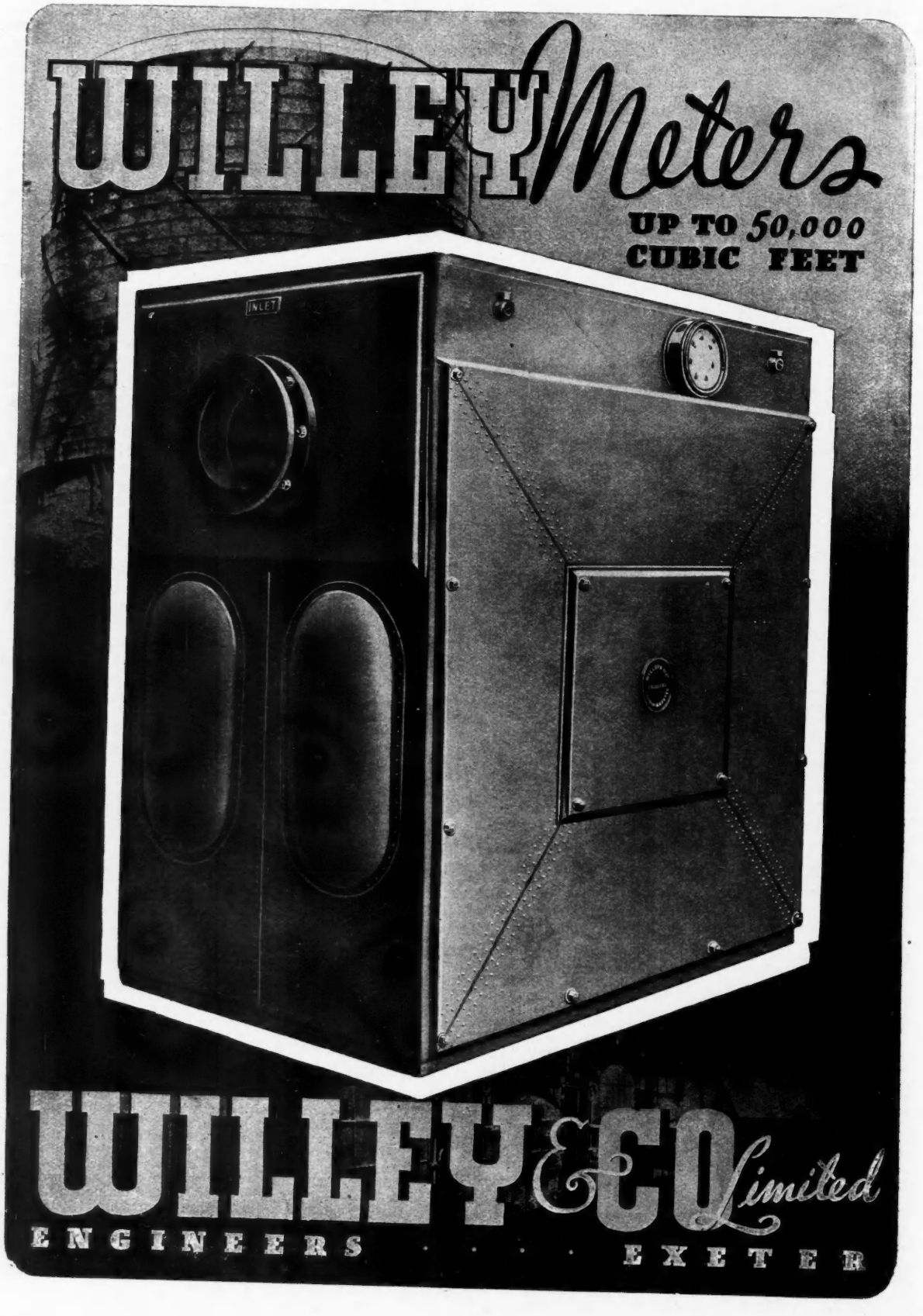
Gas Undertakings' Results

Airdrie

The annual report of the Airdrie municipal gas undertaking shows that during the past financial year the quantity of gas made was 136,145,000 cu.ft., an increase of 920,000 cu.ft. Gas sold was 128,404,000 cu.ft., an increase of 2,036,600 cu.ft. Developing industries in the area of supply indicate increasing consumption from this source. Total income was £32,898, and expenditure was £27,678, leaving a surplus balance of £5,219. A capital sum of £5,000 has been raised to meet expenditure on mains and meters for new housing schemes.

Shrewsbury

The report of the Directors of the Shrewsbury Gas Light Company for the year ended June 30, which will be presented at the annual general meeting to be held at 15, Moorgate, London, on Sept. 5, states that the gross profit on Revenue Account amounts to £14,070. Twelve months ago, the gross profit was £9,868. The Directors recommend the payment of the same dividend—namely, 6¼% for the twelve months. There has been an increase of 23,000,000 cu.ft. in the quantity of gas sold during the past year. For the twelve months to June, 1938, an increase of 4,000,000 cu.ft. in the volume sold was recorded. On the present occasion, the gas consumed for public lighting is up by about a million cu.ft. Capital expenditure during the past twelve months has been confined almost entirely to new meters and new mains and services.


WILLEY Meters
UP TO 50,000 CUBIC FEET
INLET
WILLEY & CO Limited
ENGINEERS . . . . . EXETER

Markets and Manufactures

Current Sales of Gas Products

The London Market

Aug. 21.

Prices of tar products show no changes as compared with a week ago:

Pitch, nominal at about 25s. to 26s. per ton f.o.b.
Creosote, 3¼d. to 3¾d.
Refined tar, 3¾d.
Pure toluole, 2s. 5d. to 2s. 6d.
Pure benzole, 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, 11s. to 12s.
All per gallon naked at makers' works.

The Provinces

Aug. 21.

Crude Gas-Works Tar, 10s. to 15s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 25s. to 27s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 25s. to 27s.* Toluole, naked, North, 1s. 10d. to 1s. 11d. Coal tar, crude naphtha, in bulk, North 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4¼d. to 1s. 5d. Heavy naphtha, North, 1s. 2¼d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 3⅝d. to 4⅛d.; low gravity, 4d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal, "B" quality unsaleable. Heavy oil: Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5¼d. to 5¾d.; heavy tar oil, gr. less than 1,080, 4¼d. to 4¾d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls, whatever they may be.

Scotland

GLASGOW, Aug. 19.

There is no immediate sign of any improvement in trading conditions, and prices generally are rather unstable.

Crude gas-works tar.—Actual value is now about 26s. to 28s. per ton *ex* Works in bulk.

Pitch of Vertical quality is commanding little or no attention at round 20s. to 21s. per ton f.o.b. for export and 20s. per ton *ex* Works in bulk for home trade.

Refined tar.—Home market is consuming fairish quantities, but makers are still overproducing. Home price is unchanged at 3¾d. to 4d. per gallon while for export supplies can be secured at about 2½d. to 2¾d. per gallon, into buyers' packages at makers' works.

Creosote oil.—Plentiful supplies are available at the following prices: Specification oil, 3½d. to 3¾d. per gallon; low gravity, 4¼d. to 4½d. per gallon; neutral oil, 3¾d. to 4d. per gallon; all *ex* works in bulk.

Cresylic acid.—Supplies are plentiful and, demand being poor, prices are easy as under: Pale, 97/99%, 1s. 2d. to 1s. 3d. per gallon; Dark, 97/99%, 1s. to 1s. 1d. per gallon; Pale, 99/100%, 1s. 4d. to 1s. 7d. per gallon; all *ex* Works in buyers' packages.

Crude naphtha remains quietly steady at about 5d. to 5½d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 4d. to 1s. 5d. per gallon and 90/190 heavy naphtha is about 1s. 1½d. to 1s. 2d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—Supplies are difficult to secure and prices are higher at 12s. to 13s. per gallon for 90/160 grade and 14s. to 15s. per gallon for 90/140 grade.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole ...	0 9½	to	0 10	per gall. at works
Motor ,, ...	1 3	,,	1 3½	,, ,, ,,
90% ,, ...	1 4	,,	1 4½	,, ,, ,,
Pure ,, ...	1 8	,,	1 8½	,, ,, ,,

Contract Advertised

A.R.P. Materials.

Brighouse Gas Department. [p. 462.]

Dividend Announced

Metropolitan Gas Company of Melbourne.—The report of the Directors of the Metropolitan Gas Company of Melbourne indicates the following results: Net profit for year ended June 30, 1939, £194,171; transfer to reserved fund account, £15,000; carried forward, £79,407; final dividend, 6s. 6d. Australian.

PROTECT WITH

METROTECT

a bituminous paint producing a pleasant satin black finish with highly waterproof and anti-corrosive properties.

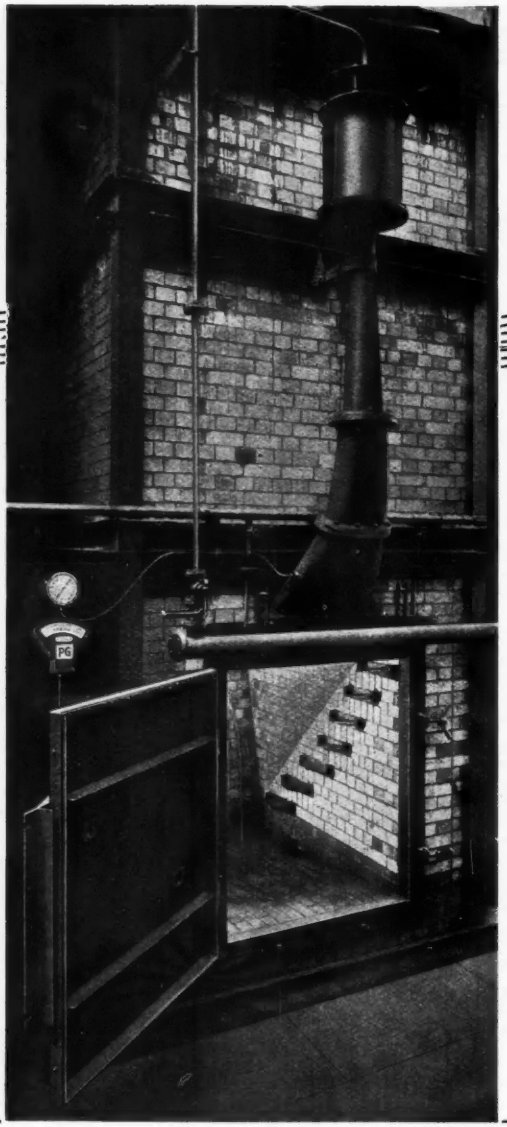
Protects steel-work which is continuously or periodically immersed in water. Does not become brittle on prolonged atmospheric exposure. METROTECT flows freely under the brush and can be applied quickly and without effort even in cold weather.

Prices and further particulars from—

SOUTH METROPOLITAN GAS CO.

PRODUCTS DEPARTMENT,
REGIS HOUSE,
KING WILLIAM STREET,
E.C.4.

MODERN DESIGN—



MODERN

EQUIPMENT

Pressure producer equipment installed with Glover-West vertical retorts for the Leeds Corporation Gas Department (Meadow Lane Works).

West's carbonizing plants combine the features of present-day practice by which the most exacting requirements of retort house control and efficiency are met. The increased fuel economy realised by the introduction of pressure producer equipment is one direction in which the ideal of maximum results from the coal carbonized is attained.

WEST'S

WEST'S GAS IMPROVEMENT CO., LTD. MILES PLATTING, MANCHESTER 10
AND COLUMBIA HOUSE, ALDWYCH, W.C.2

GAS STOCKS AND SHARES

The volume of business on the Stock Exchange last week continued small, and while the present international tension persists, little, if any, improvement can be expected. Some idea of the dull conditions is evidenced by the fact that so far this month recorded transactions are about 20% below those for the corresponding period last year. Gilt-edged stocks weakened, though the closing quotations were a little above the worst, and home rails remained under the influence of labour troubles. There was no great selling pressure in the industrial sections, but prices tended to drift downwards. Oils were fairly steady, while rubber shares reacted on profit-taking.

Gas stocks and shares opened very quietly, though the volume of business became a little heavier as the week progressed. Compared with the fluctuations which have taken place in other sections, prices in the gas market are standing up to the situation remarkably well, and it will be seen in the Stock and Share Lists that with few exceptions, and these not all in a downward direction, quotations again closed unchanged. Strangely enough the only notable increase occurred in the stock of an undertaking operating abroad—viz., the Malta and Mediterranean which was marked up 3 points to 130½, several parcels changing hands up to 131½ during the week. Gas Light units reacted again, closing 6d. lower at 21s. Quotations at the Provincial Exchanges, apart from *ex* div. markings, remained unchanged, and in the Supplementary List the only alterations affected the two Wakefield stocks.

The accounts of the Metropolitan Gas Company (of Melbourne) for the year to June last show a net profit of £194,171 against £210,565 for 1937-38. The final dividend is unaltered at 6½%, making 13% for the year (the same), and after allowing for the transfer of £15,000 (against £30,000) to the reserve fund, the carry-forward will be £79,407, as compared with £78,986 brought in.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 18.	Rise or Fall on Week.
1,767,439	Mar. 6	8	8	Alliance & Dublin Ord. ...	130—140	...
374,000	June 19	4	4	Do. 4 p.c. Deb. ...	88—93	...
877,576	May 8	5	5	Asscd. Gas & Water U'd'ts Ord.	16/—18/—	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
535,545	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	17/—19/—	...
318,730	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	15/—17/—	...
750,000	Mar. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
560,070	Feb. 20	7	7	Barnet Ord. 7 p.c.	150—160	...
300,000	Apl. 6	1/4⅜	1/9⅜	Bombay, Ltd.	19/—21/—	...
181,185	Feb. 20	9½	9½	Bournemouth Sliding Scale ...	185—195	...
690,526	,,	7	7	Do. 7 p.c. max. ...	153—158	...
493,960	,,	6	6	Do. 6 p.c. Pref. ...	125—130	...
50,000	June 5	3	3	Do. 3 p.c. Deb. ...	70—75	...
362,025	,,	4	4	Do. 4 p.c. Deb. ...	95—100	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	110—115	...
357,900	Feb. 20	7½	7½	Brighton, &c., 6 p.c. Con. ...	133—138	...
659,955	,,	6¾	6¾	Do. 5 p.c. Con. ...	118—123	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref. ...	110—115	...
855,000	Mar. 20	7	8	British Ord.	102—112	...
100,000	June 19	7	7	Do. 7 p.c. Pref.	136—141	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...
120,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	..
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
100,000	22 May '33	6	4	Cape Town, Ltd.	¼—⅜	−½
100,000	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref.	¼—⅜	−1
150,000	June 19	4½	4½	Do. 4½ p.c. Deb.	58—68	...
626,860	July 17	6	6	Cardiff Con. Ord.	108—113	...
237,860	June 5	5	5	Do. 5 p.c. Red. Deb. ...	102—107	...
98,936	Mar. 20	2/—	2/—	Colombo Ord.	1⅛—1⅛	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref.	22/—24/—	...
739,453	Mar. 20	−/11.48	−/11.48	Colonial Gas Assn. Ltd. Ord. ...	16/—18/—	...
296,144	,,	1/3.30	1/3.30	Do. 8 p.c. Pref.	23/—25/—	...
1,775,005	July 31	4	4	Commercial Ord.	50—55*	...
140,000	Feb. 6	§13/4	4	Do. 4 p.c. Red. Pref. ...	90—95	...
620,000	June 5	3	3	Do. 3 p.c. Deb.	59—64	...
286,344	Feb. 20	5	5	Do. 5 p.c. Deb.	105—110	...
200,000	,,	5⅔	4	Do. 3⅔ p.c. Red. Deb. ...	95—100	...
807,560	July 31	7	7	Croydon sliding scale	123—128*	...
644,590	,,	5	5	Do. max. div.	92—97*	...
620,385	June 19	5	5	Do. 5 p.c. Deb.	107—112	...
208,660	Feb. 20	5	5	Dudley, Brierley Hill & Dist. Ord.	102—107	...
82,275	,,	5	5	Do. 5 p.c. Con. Pref. ...	103—108	...
79,000	,,	3⅔	3⅔	Do. 3⅔ p.c. Red. Deb. ...	95—100	...
239,000	July 31	5	5	East Hull Ord. 5 p.c.	86—91*	...
187,215	Feb. 6	6	6	East Surrey Ord. 5 p.c. ...	100—105	...
176,211	June 5	5	5	Do. 5 p.c. Deb. ...	105—110	...
250,000	July 3	4	8	Gas Consolidation Ord. 'B' ...	18/6—20/6	...
250,000	May 22	4	4	Do. 4 p.c. Red. Cum. Pref.	17/—19/—	...
19,172,463	July 31	5⅔	5⅔	Gas Light & Coke Ord. ...	20/6—21/6*	−/6
2,600,000	,,	3⅔	3⅔	Do. 3⅔ p.c. max.	67—72*	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	87—92*	...
2,993,000	July 3	3⅔	3⅔	Do. 3⅔ p.c. Red. Pref. ...	90—95	...
8,602,497	May 22	3	3	Do. 3 p.c. Con. Deb. ...	71—76	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	105—110	...
3,500,000	,,	4¼	4¼	Do. 4¼ p.c. Red. Deb. ...	103—108	+1
700,000	Mar. 6	3¼	3¼	Do. 3¼ p.c. Red. Ded. ...	90—95	...
270,466	July 31	6	6	Harrogate New Cons.	95—100*	...
157,500	Mar. 20	‡1/—	‡1/—	Hong Kong and China Ord. ...	⅜—½	..
5,600,000	May 8	8	12	Imperial Continental Cap. ...	111—116	...
172,810	July 31	3½	3½	Do. 3½ p.c. Red. Deb. ...	85—90*	...
63,480	June 19	3	3	Maidstone 3 p.c. Deb.	57—62	...
45,000	May 22	†10	†10	Malta & Mediterranean ...	128—133	+3
				Metropolitan (of Melbourne) ...		
392,000	Apl. 6	5½	5½	5½ p.c. Red. Deb.	98—103	...
231,977	Feb. 20	5	5	M.S. Utility 'C' Cons.	95—100	...
968,658	,,	4	4	Do. 4 p.c. Cons. Pref. ...	83—88	...
390,076	June 19	4	4	Do. 4 p.c. Deb. ...	90—95	...
148,955	June 19	5	5	M.S. Utility 5 p.c. Deb. ...	105—110	...
125,000	July 3	3½	3½	Do. 3½ p.c. Red. Bds. ...	92—95	...
675,000	May 8	†6	†3	Montevideo, Ltd.	52—62	...
250,000	Mar. 6	7½	7½	North Middlesex 6 p.c. Con. ...	135—140	...
396,160	July 31	5	5	Northampton 5 p.c. max. ...	101—106*	...
300,000	April 24	†9	†7	Oriental, Ltd.	135—145	...
468,537	June 5	7	8	Plymouth & Stonehouse 5 p.c.	112—117	...
621,667	July 31	8½	8½	Portsmouth & Gosport Cons.	132—142*	...
241,446	,,	5	5	Do. 5 p.c. max.	95—100*	...
73,350	,,	5	5	Do. 5 p.c. Pref.	100—105*	...
75,000	,,	4	4	Do. 4 p.c. Pref.	81—86*	...
114,000	July 31	5	5	Preston 5 p.c. Pref.	100—105*	...
247,966	June 19	4	4	Primitiva 4 p.c. Cons. Deb. ...	95—100	...
625,959	July 17	4	4	Do. 4 p.c. Red. Deb. ...	93—98	...
15,000	Mar. 6	6	6	San Paulo 6 p.c. Cum. Pref. ...	7⅜—8⅜	...
441,275	May 8	1/1¼	1/1¼	Severn Val. Gas Cor. Ld. Ord.	19/—21/—	...
460,810	Mar. 20	−/10⅝	−/10⅝	,, ,, 4½ p.c. Cum. Pref. ...	19/—21/—	...
133,201	Mar. 6	8½	5	Shrewsbury 5 p.c. Ord. ...	110—120	...
9,000	June 5	†4	†4	South African Ord.	4—5	.
1,996,297	April 24	1/2⅜	1/2⅜	South East'n Gas Cn. Ld. Ord.	20/6—22/6	...
1,000,000	Mar. 6	−/10⅝	−/10⅝	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	−/6
769,191	,,	4	4	Do. 4 p.c. Cum. Pref. ...	16/—18/	..
450,000	Feb. 6	4	4	Do. 4 p.c. Deb.	95—100	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
6,709,895	July 31	6	5	South Met. Ord.	79—84*	...
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	116—121*	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	83—88*	...
1,895,445	June 19	3	3	Do. 3 p.c. Deb.	68—73	...
1,000,000	July 17	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...
600,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Deb. ...	92—97	...
1,543,795	July 31	6	6	South Suburban Ord. 5 p.c. ...	101—106*	...
512,925	,,	5	5	Do. 5 p.c. Pref.	101—106*	...
500,000	,,	4	4	Do. 4 p.c. Pref.	83—88*	...
250,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	89—94*	...
888,587	June 5	5	5	Do. 5 p.c. Deb.	107—112	...
250,000	,,	4	4	Do. 4 p.c. Deb.	89—94	...
200,000	July 31	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94*	...
427,859	Apl. 6	9⅜	1/2⅜	S. Western Gas & Water Ord.	15/—17/—	...
160,523	Apl. 6	−/10⅝	−/10⅝	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
110,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	...
750,541	July 31	5½	5	Southampton Ord. 5 p.c. ...	100—105*	...
148,836	June 5	4	4	Do. 4 p.c. Deb.	89—94	...
350,000	July 31	5½	5½	Swansea 5½ p.c. Red. Pref. ...	102—107*	...
200,000	June 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
1,076,490	July 31	6¼	6¼	Tottenham and District Ord....	105—110*	...
409,835	,,	5½	5½	Do. 5½ p.c. Pref.	108—113*	...
62,235	,,	5	5	Do. 5 p.c. Pref.	100—105*	...
453,380	June 19	4	4	Do. 4 p.c. Deb.	87—92	...
85,701	June 5	6	6	Tuscan 6 p.c. Red. Deb. ...	95—100	...
1,247,505	May 8	4	6	U. Kingdom Gas Cor. Ord. ...	15/6—17/6	...
1,085,952	May 8	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	17/—19/—	...
772,709	,,	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	17/6—19/6	...
745,263	June 5	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf.	13/6—15/6	...
1,093,656	Mar. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
378,106	Mar. 6	7	7	Uxbridge, &c., 5 p.c.	120—125	...
133,010	,,	5	5	Do. 5 p.c. Pref.	102—107	...
1,371,138	July 31	7	6½	Wandsworth Consolidated ...	107—112*	...
2,525,768	,,	4	4	Do. 4 p.c. Pref.	82—87*	...
1,343,964	June 19	5	5	Do. 5 p.c. Deb.	107—112	...
383,745	,,	4	4	Do. 4 p.c. Deb.	89—94	...
400,000	,,	3⅔	3⅔	Do. 3⅔ p.c. Red. Deb. ...	92—97	...
558,342	July 31	6⅔	6⅔	Watford and St. Albans Ord. ...	107—112*	...
200,000	,,	5	5	Do. 5 p.c. Pref.	100—105*	...
200,000	,,	5½	5½	Do. 5½ p.c. Pref.	106—111*	...
200,000	,,	4	4	Do. 4 p.c. Rd. Pf. (1973/8)	90—95*	...
100,000	,,	—	—	Do. 4 p.c. Red. Pf. (1959)	97—102*	...
200,000	June 19	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
200,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	83—88	...

a.—The quotation is per £1 of Stock. * Ex. Div. † Paid free of income- tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Contd.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations August 18.	Rise or Fall on Week.
202,152	Mar. 20	5	5	Ascot Ord.	97—102	...
128,182	July 3	5	5	Do. 5 p.c. Pref.	101—106	...
31,035	Mar. 20	–/4⅛	–/4⅛	Associated Utilities 4 p.c. Pref.	15/—17/–	...
100,000	June 19	3⅛	3⅛	Do. 3⅛ p.c. Red. Deb. ...	93—98	...
17,000	Feb. 20	8	8	Bognor Orig. Ord. 'A' ...	140—150	...
62,210	,,	8	8	Do. New Add. 'A' ...	140—150	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	135—145	...
37,440	July 31	10	10	Cam. Univ. & Town 10 p.c. max.	160—170*	...
125,970	,,	7	7	Do. 7 p.c. max.	115—125*	...
39,025	,,	5	5	Do. 5 p.c. max.	95—100*	...
96,410	July 17	4½	4½	Cardiff 4½ p.c. Pref.	92—97	...
55,520	July 31	6	6	Colchester 6 p.c. Pref.	113—118*	...
90,550	Mar. 20	5	5	Do. 5 p.c. Deb. ...	103—108	...
150,000	July 31	4	4	Croydon 4 p.c. Pref.	84—89*	...
130,000	June 19	4	4	Do. 4 p.c. Deb.	90—95	...
65,000	Mar. 6	7½	7½	Eastbourne 'A' 5 p.c.	122—132	...
198,000	,,	6	6⅔	Do. 'B' 3½ p.c.	105—115	...
112,312	,,	5	5	Do. 5 p.c. Pref.	102—107	...
130,000	June 19	5	5	Do. 5 p.c. Deb.	105—110	...
130,500	Aug. 10	7½	7½	Exeter New Ord. (£10) ...	13½—15½*	...
24,000	Feb. 20	8½	8½	Gt. Yarmouth 8½ p.c. max. (£30)	25—30	...
59,400	,,	7½	7½	Do. 7½ p.c. max. (£30) ...	27—32	...
51,160	June 5	5½	5½	Do. 5½ p.c. Deb.	115—120	...
152,600	Feb. 20	8	9	Guildford Cons.	150—160	...
54,055	,,	5	5	Do. 5 p.c. Pref.	102—107	...
68,250	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
156,600	Feb. 20	7	7	Hampton Court Cons. ...	103—113	...
86,046	June 19	‡4½	‡5	Holyh'd&N.W.G.&W.Cpn.Ord.	13/6—15/6	...
80,000	Mar. 6	4	4	Lea Bridge 4 p.c. Pref.	80—85	...
60,000	,,	6	6	Do. 6 p.c. Pref.	115—120	...
94,876	June 5	4	4	Do. 4 p.c. Deb.	87—92	...
73,620	Mar. 6	8¾	8¾	Luton Cons. 'A'	150—160	...
107,960	Mar. 20	4	5½	Mid Kent Ord. (£10)	8½—9½	...
230,940	July 31	10	10	Oxford & District Ord. ...	157—167*	...
47,112	,,	5	5	Do. 5 p.c. Pref.	96—101*	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111*	...
126,193	May 8	7½	7½	Peterborough Ord.	134—139	...
64,990	Mar. 6	7½	7½	Redditch Ord.	115—125	...
166,850	July 31	8	8	Romford Ord.	137—142*	...
60,000	,,	4	4	Do. 4 p.c. Pref.	95—100*	...
44,000	Mar. 20	5	5	Do. 5 p.c. Deb.	107—112	...
25,570	July 31	5¼	5½	Rugby 5½ p.c. Pref.	116—121*	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	103—108*	...
42,750	June 5	5½	5½	Do. 5½ p.c. Deb.	113—118	...
110,950	Feb. 20	8	8	Ryde Ord.	140—150	...
270,086	Mar. 20	7	7	Slough Ord.	120—130	...
21,000	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
28,872	May 8	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	16/—18/–	...
28,866	Mar. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	17/—19/–	...
117,228	Feb. 20	5	7	Swindon Cons.	100—105	..
60,425	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
64,380	June 19	5	5	Torquay & Paignton 5 p.c. Pref.	102—107	...
130,000	Feb. 6	5	8	Wakefield Ord.	103—108	–4½
81,650	,,	5	5	Do. 5 p.c. max.	83—88	–7
82,000	July 31	6	6	Weymouth Ord.	101—106*	...
273,626	Feb. 6	7	7	Wolverhampton Cons. Ord. ...	129—134	...
98,384	Feb. 6	6	6	Do. 6 p.c. Pref.	115—120	...
160,000	June 19	5½	5½	Do. 5½ p.c. Red. Deb. ...	102—107	...
106,490	Mar. 20	5½	5½	Wrexham Ord.	91—96	...
90,000	June 19	5	5	York 5 p.c. Red. Deb.	102—107	...
133,640	July 31	6½	6	Yorktown (Cam.) 5 p.c. Cons.	112—117*	...
120,000	,,	5	5	Do. 5 p.c. Pref.	100—105*	...
35,000	June 19	5½	5½	Do. 5½ p.c. Deb.	110—115	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 18.	Rise or Fall on Week
347,756	July 31	6	5	Bath Cons.	113—115*	...
1,667,250	,,	5	5	Bristol, 5 p.c. max.	106—108*	...
120,420	June 5	4	4	Do. 1st 4 p.c. Deb.	96—100	...
415,250	,,	4	4	Do. 2nd 4 p.c. Deb. ...	96—100	...
328,790	,,	5	5	Do. 5 p.c. Deb.	113—116	...
274,000	July 31	5	5	Newport (Mon.) 5 p.c. max. ...	93—95*	...
13,200	Mar. 20	7	8⅔	Pontyp'l Gas & W. 10 p.c. 'A'	12½—13½	...
13,600	,,	6	5	Do. 7 p.c. 'B'	10½—11½	...
40,000	,,	6	5	Do. 7 p.c. 'C'	10½—11½	...
140,778	July 31	5	5	Weston-super-Mare Cons. ...	102—104*	...
64,338	June 19	4	4	Do. 4 p.c. Deb.	97—99	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	146—150	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 18.	Rise or Fall on Week
157,150	July 31	6½	5	Chester 5 p.c. Ord.	105—108*	...
92,500	June 5	4	4	Do. 4 p.c. Pref.	94—98	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	86—89	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—100	...
2,167,410	Feb. 20	6	6	Liverpool 5 p.c. Ord.	113—115	...
245,500	June 19	5	5	Do. 5 p.c. Red Pref. ...	100—105	...
306,083	July 17	4	4	Do. 4 p.c. Deb.	99—101	...
106,280	July 31	10	10	Preston 'A' 10 p.c.	174—184*	...
188,219	,,	7	7	Do. 'B' 7 p.c.	126—136*	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 18.	Rise or Fall on Week
122,577	Feb. 20	8	8	Blyth 5 p.c. Ord.	149—151	...
732,000	Feb. 20	3	3	Hartlepool G. & W. Cn. & New	76—78	...
2,061,315	July 31	5⅔	5	Newcastle & Gateshead Con.	20/3–20/9*a	...
682,856	,,	4	4	Do. 4 p.c. Pref.	85—87*	–1
776,706	June 5	3½	3½	Do. 3½ p.c. Deb.	85½—87½	...
277,285	April 24	5	5	Do. 5 p.c. Deb. '43 ...	101—103	...
332,351	Feb. 6	6	6	Sunderland 6 p.c. max. ...	128—130	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 18.	Rise or Fall on Week
542,270	Aug. 10	9	6	Derby Con.	130—135*	–2
55,000	June 19	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	June 19	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	102—107	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 18.	Rise or Fall on Week
10,000	Feb. 6	10	10	Great Grimsby 'A' Ord. ...	180—190	...
6,500	,,	10	10	Do. 'B' Ord. ...	180—190	...
79,000	,,	10	10	Do. 'C' Ord. ...	175—185	...
1,806,339	Feb. 20	6½	6½	Sheffield Cons.	133—136	...
95,000	July 3	4	4	Do. 4 p.c. Deb.	99—101	...

a The quotation is per £1 of Stock.
* Ex. div. ‡ For year.

PUBLISHERS' NOTICE

TERMS OF SUBSCRIPTION

United Kingdom & Ireland : Advance Rate, 35/- per annum ; 18/- per half year. Credit Rate : 40/- per annum ; 21/- per half year.
Dominions & Colonies & United States : 35/- per annum, in advance. Other countries in the Postal Union, 40/- per annum, in advance.

A copy of the "G.J." Calendar and Directory is presented to continuous subscribers.

CLASSIFIED ADVERTISEMENTS

Situations Wanted, 6d. a line (minimum 3/-, about 36 words). Situations Vacant, Plant for Sale and Wanted, Contracts, Public Notices, Educational, &c., 9d. a line (minimum 4/6). Financial Notices, 1/- per line. Box Number, 6d. extra.

WALTER KING, LTD.,

Telephone : Central 2236-7-8. 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Telegrams : Gasking, Fleet, London.